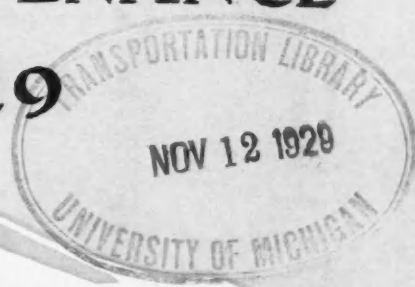


COMMERCIAL CAR JOURNAL

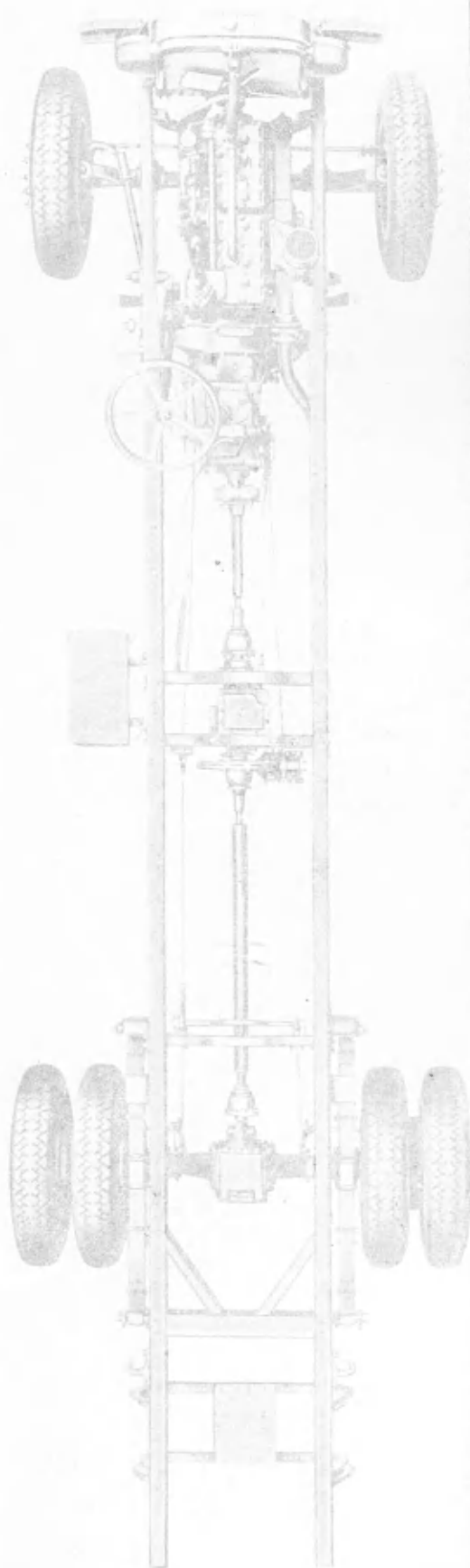
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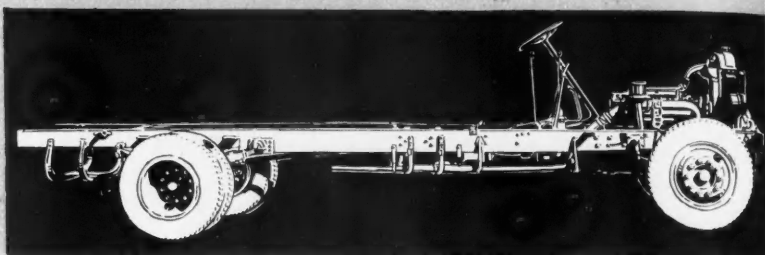


DODGE TRUCKS

For profit-minded truck buyers—those who seek greater business prestige, greater savings in time, greater hauling economy—Dodge Trucks have an instant appeal. In these able workers they find the qualities that insure lowered hauling costs, and thus greater profits.



AUTOCAR RANGER



FOR HAULING AT
SUSTAINED HIGH
SPEED DAY AFTER DAY

THE Autocar Ranger is a high-speed 6-cylinder unit of true Autocar stamina and quality. It is designed specially to deliver continuous, trouble-free service for modern retail and industrial organizations which serve a large number of outlets from a central distributing point. Such operators, who must haul speedily *every* day to distant markets, all find this unit entirely adequate and satisfactory.

Autocar Ranger sales are the best proof of the remarkable fitness of this unit for the class of work it is sold to handle.

You are invited to write for specifications and complete information. The more you know the practical side of your business, the more these specifications will impress you. Please state, when writing, whether you are interested as a prospective user or as a prospective Autocar Dealer.

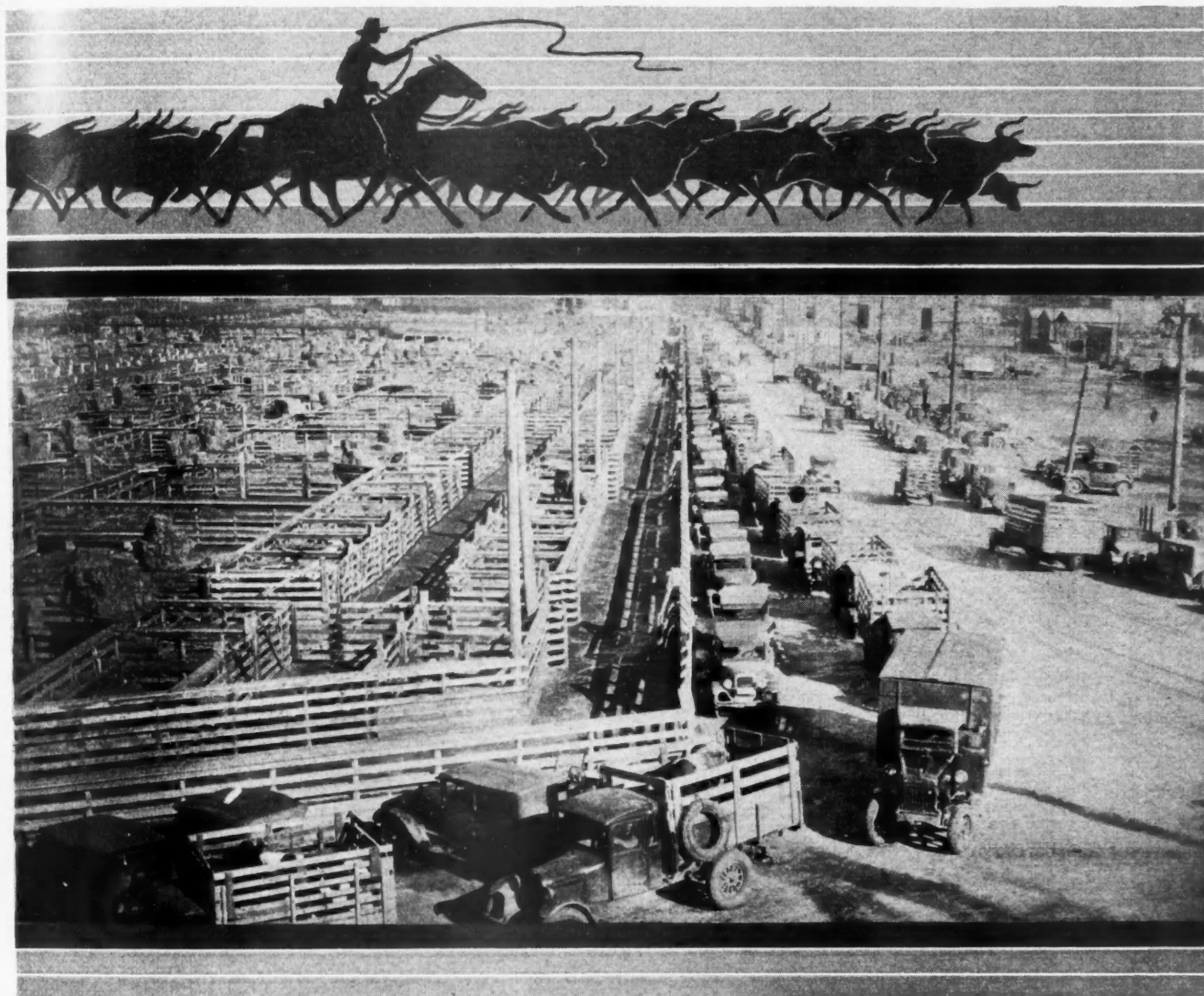
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THE AUTOCAR COMPANY
ARDMORE PENNA. EST. 1897

COMMERCIAL CAR JOURNAL AND OPERATION & MAINTENANCE

VOL. XXXVIII

PHILADELPHIA, NOVEMBER, 1929

NUMBER 3



The motor truck has won the gratitude of farmers who depend upon livestock for part of their livelihood.

The total tonnage of livestock shipped by truck to the 17 central markets during 1928 was estimated at 3,400,000,000 lb., representing 12,193,058 head, and a total value of more than \$350,000,000. Thus every business day in the year an average of more than \$1,000,000 worth of livestock was hauled by motor truck to the central markets.

Back in 1927 the receipts were 8,393,101 head; in 1926, 6,890,456, and in 1925, 5,378,868. The 1928 total was an increase of 127 per cent over 1925.

The extent to which the truck is competing with the railroads on this class of freight is indicated by the experience of Sioux City. In 1924 livestock receipts by railway totaled approximately 4,300,000 head and by motor truck 550,000, but in 1928 receipts by railway dropped to 2,400,000 head, while motor truck receipts increased to 1,700,000.

The farmer has received most of the benefits of this new mode of marketing livestock. His delivery cost is less than by railroad; he can dispose of his animals when they are ready for market, instead of wasting feed on a few to keep them in shape while others are being fattened; he suffers less loss through shrinkage, and because of speedy delivery he can take advantage of the best market prices.

The credit for these benefits belongs to the motor truck, and its success in this field of transportation is due solely to its economic desirability.

THE REVOLUTION IN



Dry-Ice comes in marble-like cubes. It evaporates as carbon dioxide gas

THE transportation of perishables by motor truck is now undergoing a revolutionary change. A new method of refrigeration is supplanting the old water-ice method and is resulting not only in greater assurance that perishables will reach their destination in excellent shape, but is enabling truck users to carry greater payloads, equip with lighter bodies, and to operate their equipment more economically. The repercussions of this revolution have been felt among truck dealers and salesmen because the new developments have exploded the foundations on which the truck trade heretofore has reared its structure of transportation recommendations to vocations needing refrigerated equipment.

The more alert truck dealers and salesmen have built their selling arguments on the new foundations, but the vast majority have still to learn what all the joyful shouting is about. And there is ample cause for jubilation. On the one hand, operators in certain vocations have at last found the very thing they have wanted ever since the first time that brine corroded a chassis. On the other hand, the trade sees that somewhere in the neighborhood of 100,000 trucks used in hauling perishables such as ice cream, dairy products, meats, etc., are rolling over highways with obsolete body equipment, which if replaced with the new idea would mean greater operating efficiency and economy.

Offhand this might seem to be merely a godsend to body builders, but we need not point out to dealers

Water-Ice Method of Transporting Perishables by Truck Due for Complete Overthrow, With New and Lighter Equipment Carrying Greater Payloads

By George T. Hook

and salesmen the course they should pursue when it is found that a 3-ton truck can accomplish the job a 5-ton truck is doing, and a 1½-ton the job a 3-ton is handling. Such is actually the case under the new order of things.

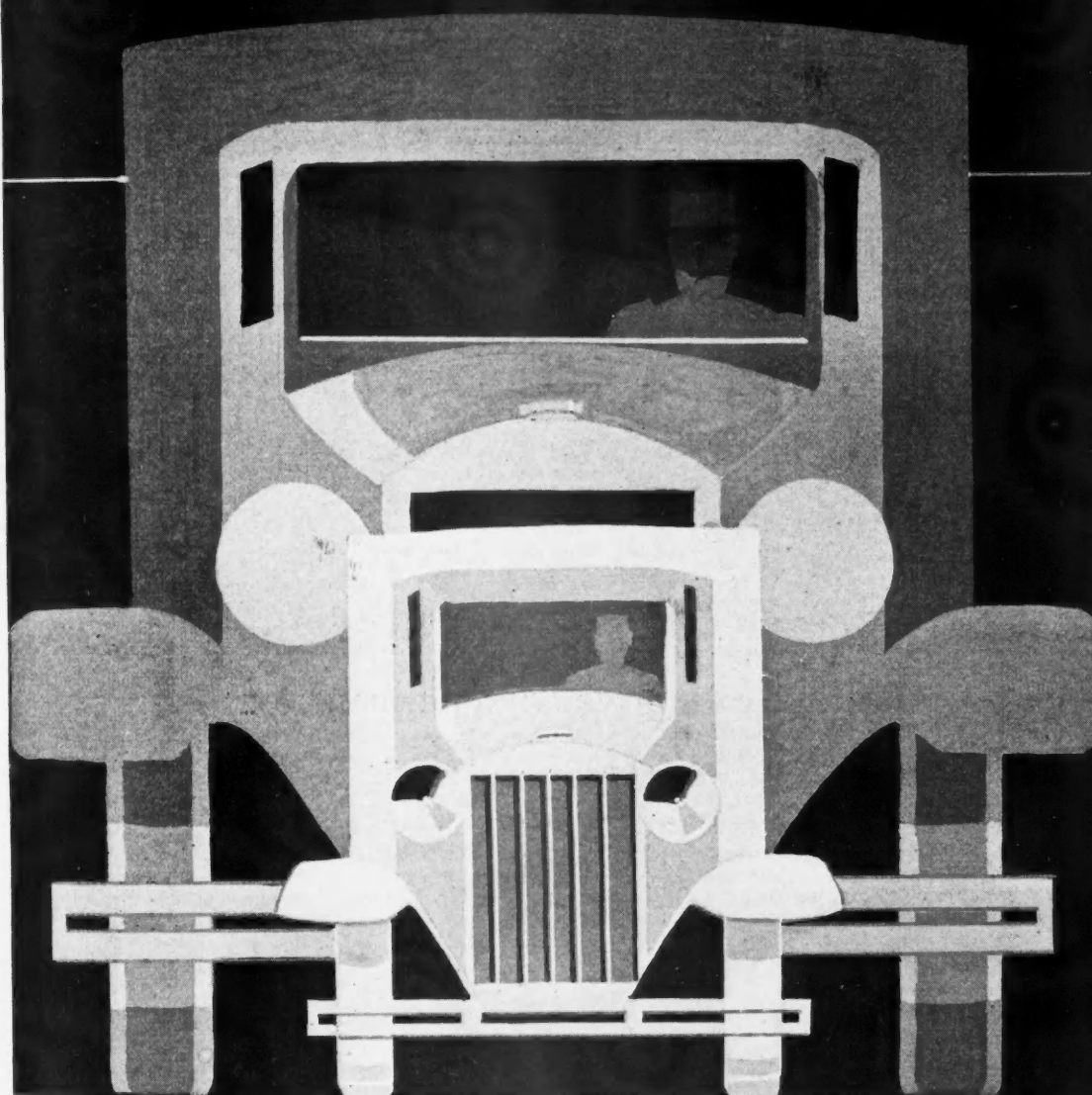
For a while it was thought that electric refrigeration would stage a revolution of its own in the truck industry. But so far it has proved to be a squib because of dissatisfaction due to failure of the mechanism to withstand road shocks incidental to heavy-duty operation. Engineers now are striving to devise a rugged piece of electrical refrigerating equipment which will bear up under the extreme conditions encountered in truck operation. It is probably safe to predict that in time the industry will see lighter, more compact and more efficient electrical refrigerating equipment for use on trucks. But, considering developments in their present state, the effects of electrical refrigeration on truck transportation of perishables can only remotely compare with the effects already accomplished by the new commercial refrigerant known as solid carbon dioxide, which is being marketed on an ever increasing scale as "Dry-Ice," the registered trade mark of the DryIce Corp. of America. Dry-Ice is more the revolutionist than electricity.

In appearance a cake of Dry-Ice is like a block of clean, closely packed snow. It is 145 deg. colder than water-ice, the Bureau of Standards giving it a rating of 114.5 deg. Fahr. below zero. Its density is about 50 per cent greater than that of water-ice. Instead of melting into water it disappears as carbon dioxide gas, a non-poisonous, non-combustible vapor, the same gas which is used in charging all carbonated beverages. A 40-lb. piece of Dry-Ice placed uncovered in a store window in mid-summer will last about 28 hr., it is estimated, and in an approved insulated storage box it will lose less than 10 per cent of its weight each 24 hr. In quantity purchases the cost is 5 cents per pound.

Considered from the viewpoint of the truck industry this mobile refrigerant has a number of highly important advantages which recommend it immediately: (1) It takes up less space since 1



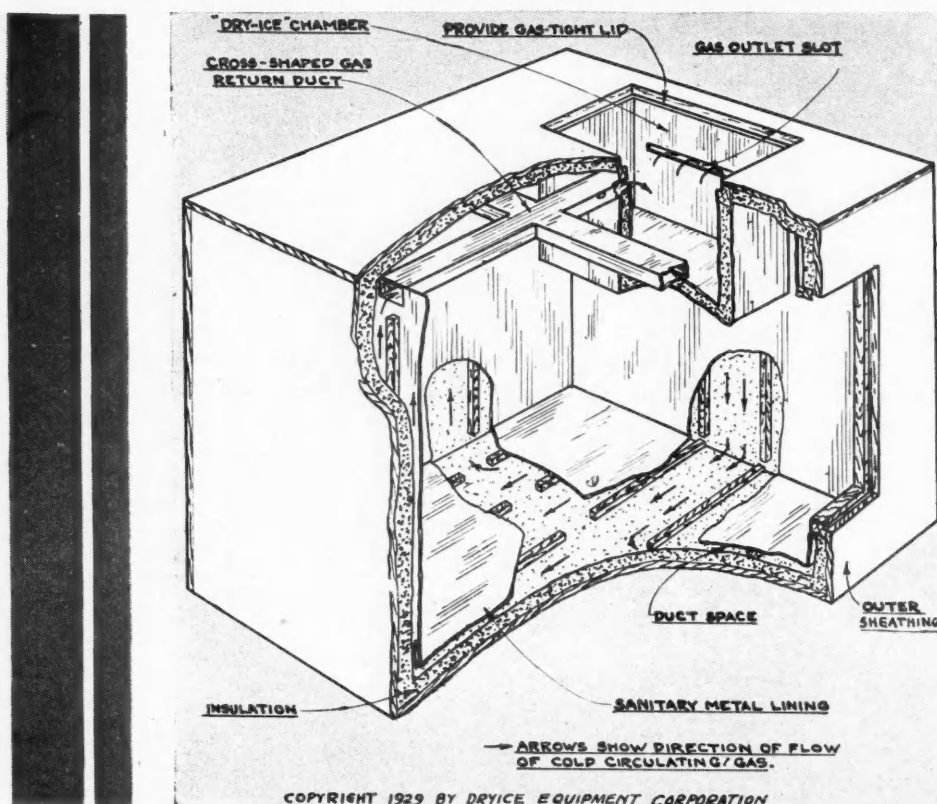
REFRIGERATION



lb. of Dry-Ice refrigerates ordinarily as much as 15 lb. of water-ice. (2) Consequently there is also a saving in weight, all of which results in (3) the ability to transport a greater payload. (4) Routes of ice cream trucks, for instance, can be lengthened and (5) the number of stops per load increased because such trucks refrigerated with Dry-Ice use pneumatic tires and travel faster and with less labor. (6) Saves on spoilage because, being non-mechanical and fool-proof, it can be relied upon to keep products in perfect condition. (7) Eliminates corrosion,

due to absence of brine, and thus reduces repair bills. (8) Cuts loading time almost in half. (9) Is more sanitary, which makes for more attractive equipment and cleaner drivers.

Most of these advantages—and in some cases all of them—are applicable to the hauling of ice cream, dairy products, meats, frozen fish, frozen fruit and fresh fruit. The ice cream business, because it enjoys all these advantages, will be the best one to furnish facts that illustrate the actual benefits to be derived by substituting Dry-Ice for water-ice and salt.



in the brine tank and that under the new method 85 lb. of Dry-Ice sufficed, the gross load carried on the chassis was reduced to 5625 lb. from 6400 lb.

This same 450-gal. job formerly covered a 35-mile route and made 80 stops. Today it covers a 60-mile route and makes 120 stops.

Similar efficiency and economy have been achieved as follows: 260-gal. job—body weight reduced from 2800 to 1700 lb. and payload increased from 1500 to 1820 lb.; 1500-gal. job—body weight reduced from 6200 to 3400 lb. and payload increased from 8750 to 10,500 lb.; 2000-gal. job—body weight reduced from 6800 to 5600 lb. and payload increased from 11,550 to 14,000 lb.

The change in the 2000-gal.

Fig. 2

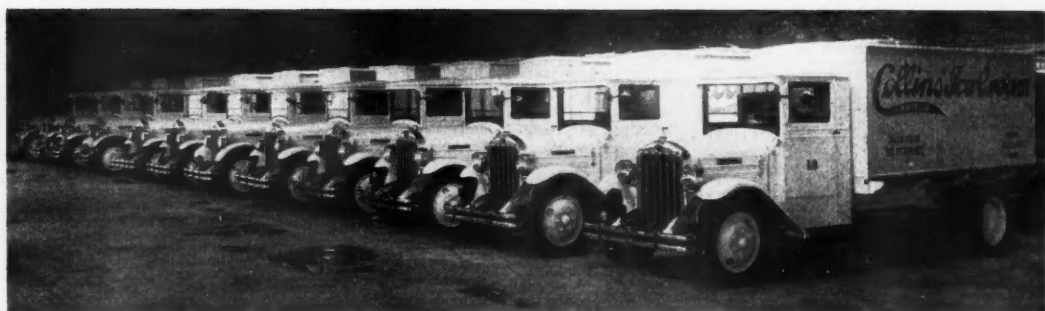
Left: Close-up of details of duct arrangement with cross return

Fig. 3

Below: These 2-ton chassis with 440-gal. Dry-Ice bodies are said to do the work of 3½ to 5-ton trucks in providing fast and economical distribution

The truth is that the ice cream industry, because of the immediate economies that can be effected, has taken solid carbon dioxide to its bosom more generally and with greater fervor than any other. In taking advantage of this refrigerant, two courses have been open to operators in the ice cream business: first, to replace water-ice-and-salt bodies with lighter bodies especially designed for Dry-Ice use, and second, to replace both chassis and body with a lighter chassis and lighter body. The latter course, it is logical to assume, is being followed only where equipment has been depreciated and would be replaced if solid carbon dioxide were non-existent.

The experience of the Colonial Ice Cream Co. of Philadelphia is perhaps typical of how ice cream companies are taking immediate advantage of the new refrigerant. According to Calvin S. Jones, superintendent of motor equipment, the Colonial company has Dry-Iced 18 of the 35 units used in making deliveries. The changeover consisted simply of building lighter, well-insulated bodies with provision of a Dry-Ice container at the top. For instance, in a 450-gal. job a 3300-lb. ice-and-salt body was removed and a 2600-lb. body substituted. This made possible an increase in payload to 2940 lb., as compared with the previous payload of 2100 lb. Taking into consideration that the old method of refrigeration required approximately 1000 lb. of ice and salt



A WEIGHT-SAVING COMPARISON

Ice Cream Capacity in Gallons	Approx. Lb. Ice & Salt in Brine Tank	Type of Chassis	Approx. Body Weight	Total Weight Body and Ice	Approx. Lb. Dry-Ice Used in 24 Hours	Type of Chassis	Approx. Body Weight	Total Weight Body and Ice	Total Weight Saved with Dry-Ice
250	675	1½-ton	2075	2750	60	1-ton	1800	1860	890
300	780	1½-ton	2350	3130	65	1-ton	1900	1965	1165
350	880	2-ton	2550	3430	70	1½-ton	2200	2270	1160
400	960	2½-ton	2750	3710	80	2-ton	2400	2480	1230
450	1100	2½-ton	2900	4000	85	2-ton	2600	2685	1315
500	1300	2½-ton	3000	4300	90	2-ton	2800	2890	1410
600	1500	3-ton	3300	4800	95	2½-ton	3100	3195	1605
750	1875	3½-ton	3700	5575	100	3-ton	3500	3600	1975

If an ice cream company were considering replacing equipment the above table would give the truck salesman soliciting the business a fair idea of the weight-saving advantage of Dry-Ice over water-ice and salt, as between two types of modern insulated bodies. In the comparison the figures dealing with bodies using Dry-Ice were furnished by the DryIce Corp. of America, while those using salt and ice were procured from a reputable body maker who has been successful in selling modern refrigerated bodies of very light construction. A good idea of the economies involved is immediately apparent in the fact that in the case of Dry-Ice a body and refrigerant weighing a total of 2890 lb. are put on a 2-ton chassis and take care of a 500-gal. payload, whereas with ice and salt 3430 lb. are put on a 2-ton chassis to handle only a 350-gal. payload.

It should be noted that the bodies compared do not provide in their construction for a crushed ice and salt compartment to take care of retailers not having modern mechanical refrigerating units. It was the only way to make an equitable comparison. It should also be noted that design and construction of water-ice bodies vary with builders, so that local conditions may enable salesmen to make an even more striking weight-saving comparison.

job just mentioned also effected a cut in delivery time. Whereas formerly it made four trips a week on a lengthy rural route, today it makes three trips and delivers approximately the same amount of ice cream. Additional economy and efficiency are achieved in that heretofore the truck, after reaching the end of its route one day, would have to be re-iced and re-salted for the return trip the next day. Now a quantity of Dry-Ice sufficient to last the two days is put in originally and eliminates the task of emptying the brine tank and re-filling it.

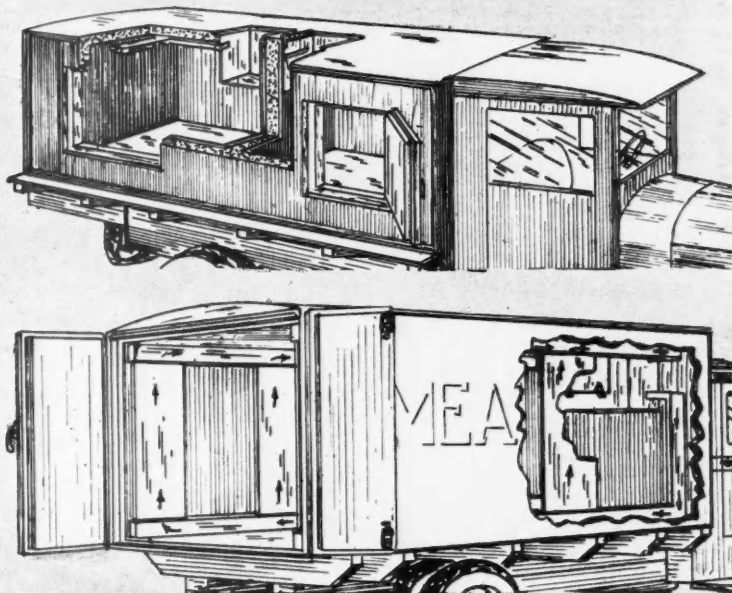
All in all, results with Dry-Ice

Fig. 4

At right, above: A cutaway view of a Dry-Ice ice cream body

Fig. 5

At right: Dry-Ice truck body for unfrozen foods. Arrows indicate direction of flow of cold circulating gas



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Fig. 6

Interior view of Dry-Ice truck box

have been so extremely satisfactory that Mr. Jones said he would have 80 per cent of his equipment changed over by the end of this year.

Many progressive meat dealers are also finding this new refrigerant of great advantage in the distribution of meat by truck. In the meat industry there are two methods of applying Dry-Ice: first, by means of a completely insulated body, and second, by means of a truck box.

A body of the completely insulated type (Fig. 5) is used when it is necessary to transport large amounts of meat and where advantage can be taken of the display value made possible

through the construction of such a body. A truck which has a capacity of 4000 lb. of meat requires approximately 70 lb. of refrigerant for 24 hr. to keep a temperature of 45 deg. Fahr.

Where routes do not require a large insulated body, the Dry-Ice truck box (Fig. 6) is used. This box is in reality a small replica of the complete body. It will carry about 1000 lb. of meat and consume approximately 25 lb. of Dry-Ice every 24 hr. Such boxes are advantageous in that they provide refrigeration without affecting vehicle carrying capacity. There are several benefits in which those engaged in meat distribution are particularly interested. The atmosphere of carbon dioxide gas which the Dry-Ice provides is said to have a very beneficial effect on the meat; there is practically no loss of "bloom." Loss through shrinkage of the meat product in warm weather is reduced to a minimum, spoilage and trim are eliminated, and so are the repair bills, which are almost always in evidence when water-ice is used. Trucks of a Philadelphia meat packer equipped with the insulated truck box average 100 stops a day, and although the refrigerated vault is opened at least 100 times daily, an average temperature of 35 deg. was maintained throughout the past summer. The cost of the refrigerant was approximately 3 cents an hour.

The DryIce company estimates that a completely insulated meat body with a capacity of 4 tons of meat requires

90 lb. of refrigerant for 24 hr. and 180 lb. for 48 hr., and that trucks equipped with meat boxes of 1500 lb. capacity require 40 lb. for 48 hr.

It must be emphasized here that no matter what vocation uses Dry-Ice, the design of the body used will determine whether or not the greatest degree of economical operation is attained. In fact, economy is so completely dependent upon the body that the DryIce Corp. of America has a subsidiary known as the DryIce Equipment Corp. which has done and is doing refrigeration engineering work, and which, as a result, has designed truck bodies embodying engineering principles that enable the operator to get all the benefits out of Dry-Ice.

An inspection of the accompanying cutaway sketches will show the details of the design on which the DryIce Equipment Corp. holds basic patents. The design (note Fig. 2) really calls for a body within a body, the two being separated by narrow strips that form a duct space in which the refrigerant—carbon dioxide gas—circulates. As the Dry-Ice evaporates, the gas passes through an outlet slot in the Dry-Ice chamber. Being heavier than air it descends a side-wall duct space to the bottom and then, as it is warmed, it rises between the other walls and returns to the chamber by means of a cross-shaped duct. This gas, which fills the space between the inner and outer bodies, is in itself an insulating layer because radiant heat meets with high resistance in passing through carbon dioxide gas.

This design together with proper materials enables the operator to achieve the four most important characteristics of an insulated truck body: Highest possible efficiency, lightest possible weight, least moisture-absorbing tendency, and permanence.

(Turn to page 46, please)

AFTER THE SALE.

Truck Dealer Executives Relate Methods They Use to Increase Shop Volume and Maintain Good-Will for Repeat Sales

By Martin J. Koitzsch

DEALERS generally are in agreement as to the value of selling service after a truck has been sold, but here their unanimity ceases. Some dealers manage to get a large proportion of their customers to come back for service, others succeed in holding only a comparatively small amount, and still others, for various reasons, are entirely indifferent about the matter. This wide variation may be assumed to be a measure of the dealer's determination to get and hold this business.

There are two advantages of getting a large percentage of customers to come back for service: first, to increase volume of service sales and profits, and second, to maintain customer good-will and so help truck sales.

These benefits are certain to accrue. The sole problem is how shall a dealer organize his forces and proceed to bring his customers back to his shop for service?

A dealer planning to concentrate on customers after the sale can follow any of several lines of contact. He can approach the customer by letter; he can keep his message before the customer by direct-mail literature; he can require the salesman who made the sale to follow-up with personal interviews monthly; he can delegate the responsibility of contacting the customer monthly to the service department; he can appeal to the customer's pocketbook by offering service specials, free service, etc., or he can employ any combination of the foregoing.

In order to give readers of *COMMERCIAL CAR JOURNAL AND OPERATION & MAINTENANCE* first hand information as to the methods of contacting cus-

tomers by going concerns, 21 truck executives in 10 key cities were interviewed and asked: "How do you contact with customers after the sale to get and hold their service business?"

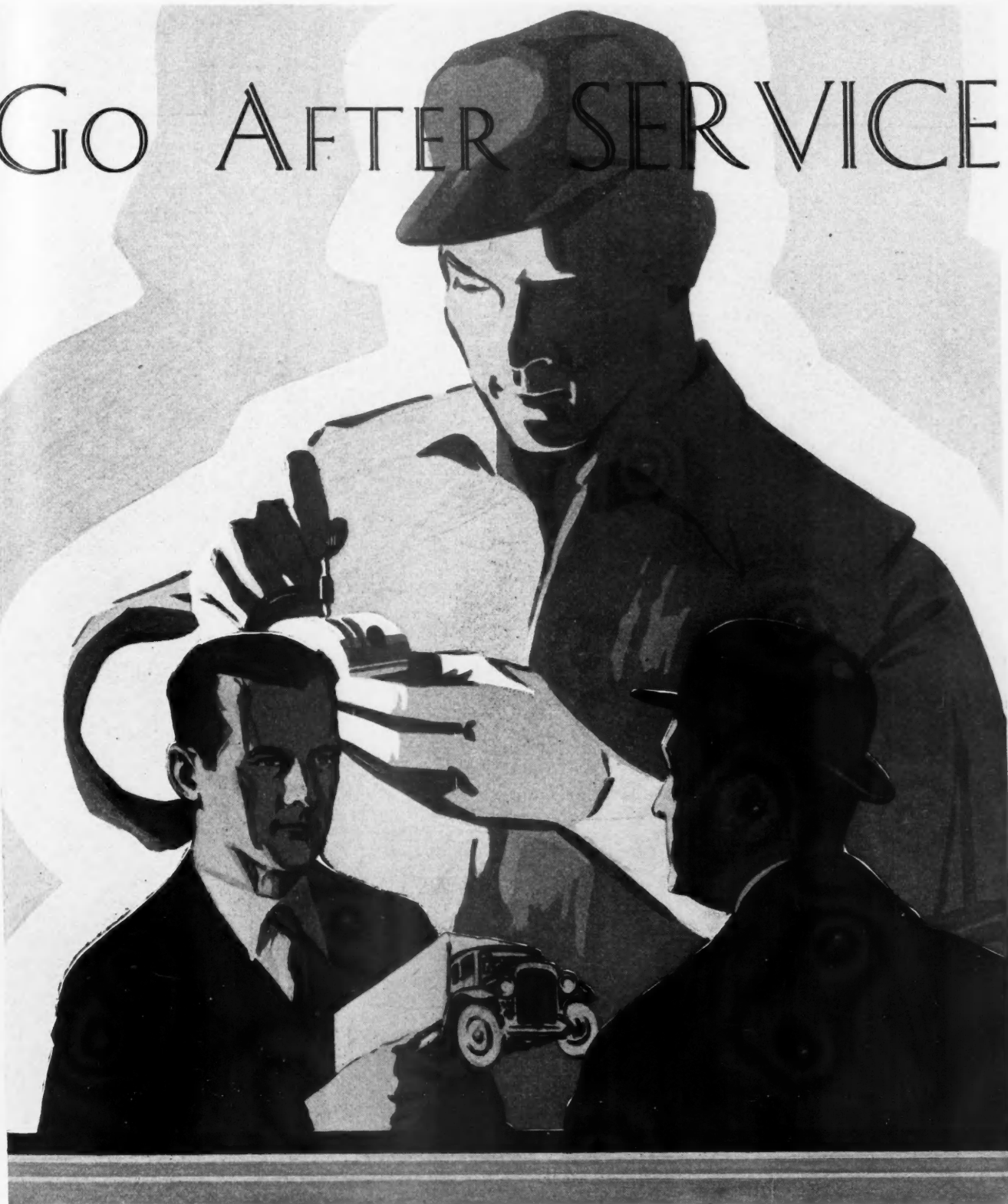
While the question elicited a surprisingly large number of excellent ideas, an analysis of the answers revealed that the plans employed by the majority are essentially similar, consisting of letters and personal contact by either the sales or service department. Methods vary mostly in detail. Among the main points of difference are: The character of letters; intervals at which they should be sent; whether letters should be followed by personal interviews, and whether the sales or service departments should do the contacting. With amicable dealer-customer relations in view many other interesting plans and methods employed by different dealers were revealed such as weekly sales and service meetings at which all customer complaints are definitely settled; indexing systems for keeping a full record of contacts and service rendered; attracting patronage through quick spare parts service; reaching the owner with a service message through drivers and mechanics; offering seasonal service suggestions, etc.

A successful user of the letter and personal call plan is the O'Brien-Davis Auto Co., Omaha, Neb., which company, according to R. E. Davis, general manager, keeps 67.9 per cent of its trucks for service the year around.

Thirty days after the sale this company sends the owner a letter requesting that the truck be brought to the shop for inspection. After the inspec-

tion the owner's name is placed on record as an active customer, and thereafter at intervals of 30 days for the next 210 days, he receives a letter outlining the company's service recom-

GO AFTER SERVICE



mendations. If at the end of that period he fails to respond, his name is transferred to an inactive list. But the customer's name is not permitted to rest in this list until the company is convinced of his inactiveness. Should a customer fail to come in for the first inspection, or after the 210-day period, a member of the sales force is dispatched to see him personally and ascertain why shop visits are not being made.

Speaking of the value of after the sale contact, E. F. Nygaard, truck de-

partment manager, J. M. Oppen Co., Reo dealer in Omaha, declared:

"Getting the truck owner into the shop is a matter productive of good-will between the dealer and the customer. Service solicitations impress the customer with the fact that the dealer is interested in him and his truck and makes him a good service customer." The plan employed by Mr. Nygaard is very similar to the O'Brien-Davis plan. After the first free inspection and service visit, the owner is encouraged by

monthly letters to drop in at the shop for a mechanical check-up. If the customer fails to respond a special letter is mailed opening somewhat as follows: "We hope that the reason for your absence is due to the truck's good performance, but it would be well for you to call anyway. We want to look the truck over to make sure that everything is properly adjusted. And winter is coming on, so don't forget the anti-freeze solution for the radiator. We know

(Turn to page 56, please)

SPECIAL BODIES FOR

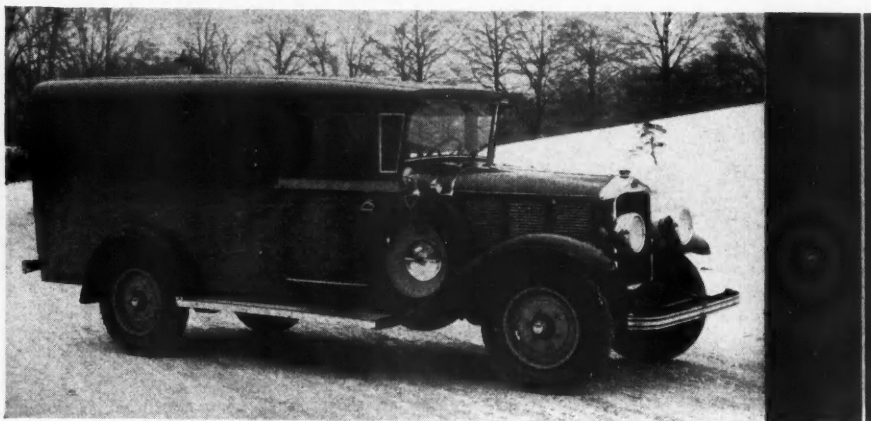


Fig. 1. White DeLuxe delivery

De Luxe Panel Delivery

SOLID appearance and attractive lines characterize the deluxe delivery model offered by the White Motor Co. for high-class delivery service (Fig. 1). The body was designed by the White Co. and built by the Bender Body Co., Cleveland.

The body frame is of ash, mortised and tenoned. Paneling is of aluminum except cowl panel and splashers, which are steel. All panels are hammered to the curve and sweeps of the body. Interior sides are optionally fitted with narrow wood slats, solid plywood panels, or both.

Windows in the doors of the driving compartment are operated by regulators, while those in the rear door are stationary. Quarter windows back of the windshield are stationary. A one-piece stationary windshield, raked with top edge beyond the lower, is standard. All doors are of the coach type.

Full or half width seats are provided in the driving compartment. Upholstery is in genuine leather. Partitions are optional and may be solid with one or two windows, half solid on the left with sliding half on right, or just half partition with balance open.

Fittings and equipment include aluminum moldings on tops of doors and on front body corners, dome lights in center of rear compartment roof, ventilators in each side and top of cowl, heavy running boards with polished metal edges, disk wheels, wide crowned fenders, nickeling of all hardware, front fender tire carriers both sides with covers, and rear-view mirrors mounted on spare tires. The accompanying illustration shows this job mounted on a White Model 60 chassis. A similar body is available

for the 133½-in. Model 15B. Inside dimensions of the latter follow: length, 100 in.; width, 58½ in., and height, 52 in.

Fox-Hauling Body

A NEW and novel use of the truck is discovered in the service it performs for Silvercross Farms, Thiensville, Wis. (Fig. 2). The owners of the farm frequently send foxes to their other farm at Hamburg, Wis., 200 miles further north, where the fur develops more rapidly in the colder climate. It was discovered that this hauling could be done more eco-

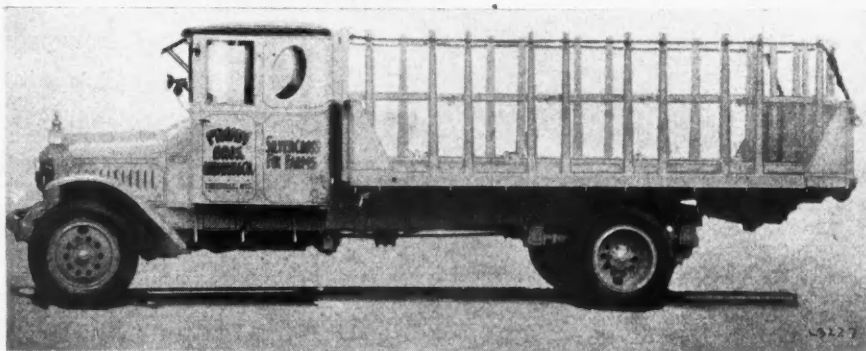


Fig. 2. This truck hauls 480 foxes per load

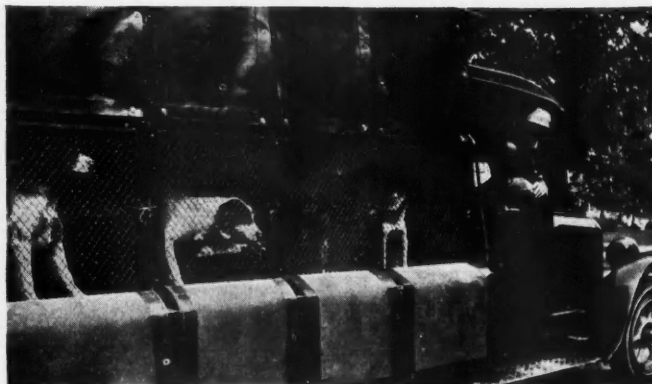
nomically by motor truck and accordingly the company purchased a 2½-ton Mack truck.

The body is constructed to carry 80 crates, each carrying six foxes. It is essentially of the platform-stake type. The stakes are constructed in pairs, five pairs to the side. To assure rigidity each pair is secured to the next by the chains drawn taut by means of a special device.

"Dog Catcher's" Body

STRAY mongrels and lost canine pets gathered in by the Society for the Prevention of Cruelty to Animals of Hamilton County, Ohio, receive exceptionally good treatment en route to the dog-pound compared with the standards of yesterday (Figs. 3 and 6). Formerly dogs of this county, regardless of breed or physical condition, were thrown together in a one-compartment wire cage mounted

Fig. 3. Segregation protects dogs against injury



SPECIAL PURPOSES

on a light passenger car chassis. Today they are transported in a specially designed 16-cage body, mounted on a two-ton Dodge.

The body, designed by John Porter, chief of the society, and built by John Simms Co., consists of 16 compartments, two rows of four on each side. The front of each cage is a door made of strong wire and equipped with padlocks and black curtains.

A narrow space 4 in. wide, extending from the back of the cab to the end of the body, separates the cages. In this space are stowed nets, slip-nooses, gloves, etc.

The walls of the cages are of sheet

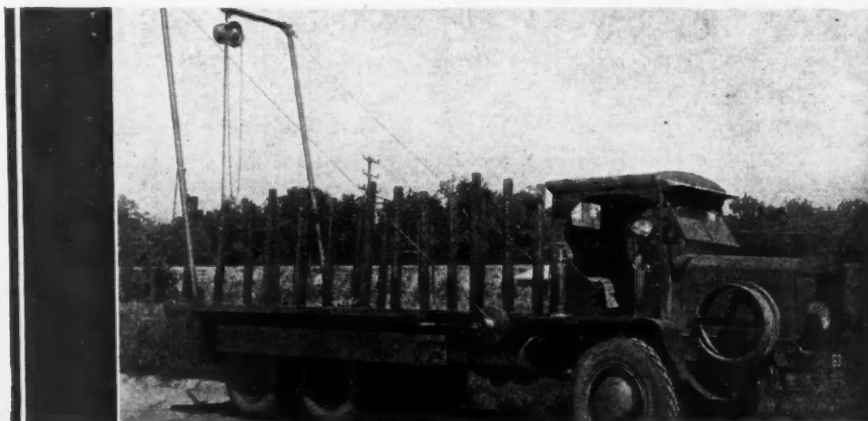


Fig. 4. Airplane service body



Fig. 5. Equipment for high or low spraying

iron, welded at the corners and lined with heavy zinc. Floors and ceilings are also of iron. The floors of each row are sloped almost imperceptibly toward the center and down the rear of each row is a drain. Dimensions of the body follow: Length, 10½ ft.; width, 5½ ft., and height, 6 ft.

Entomological Patrol

A COMBINATION spraying and utility truck for combating blights to vegetation and for tree handling, recently added to the equipment of the department of Parks, Trenton, N. J., has proved successful.

The truck, known as the Entomological Patrol, is a two-ton Model SDB Autocar Dispatch, equipped with capstan, tank, pumping engine and hose (Fig. 5). The tank holds 300 gal. of spray liquid, enough for 40 moderate-sized trees. A four-cylinder, 15-hp. LeRoi engine drives a pump consist-

Fig. 6. Old method of caging dogs



The Commercial Car Journal
and Operation & Maintenance

ing of three 4 by 5½ in. plungers and developing 400-lb. pressure. Liquid is forced through a ¼-in. outlet in the spray nozzle at 30 gal. per min.

During the off season the spraying equipment is removed for a flat body. Equipment includes a capstan, driven from the power take-off.

Airplane Salvage Body

AIR CORPS, U. S. Army, recently put in service a special truck for salvaging wrecked airplanes, either on airports or at distant points not readily accessible (Fig. 4). The body, which is of the platform type, 18 by 7 ft., with removable posts and wing racks, will carry a complete airplane of the pursuit or observation type, or parts of larger planes.

A hand-operated boom with chain hoist is provided for loading heavy equipment. Chassis is a six-wheel Coleman with six-wheel drive, and equipped with single pneumatic tires all around.

The boom may be lowered when not in use. It is raised for operation by pulling it back until two pins attached to side channels can be inserted in boom fittings which slide inside the side channels. The two wire cables are then placed in position over pulleys on tops of two rear body posts. The boom is then raised by turning either crank on the windlass. A chain hoist is attached to cross-bar of the boom by a fitting which engages the hoist hook. Stakes are padded. There are three floodlights for night work, two mounted on outside and one inside. The inside light is portable and is provided with a 50-ft. extension cord. Storage space is provided in the body for carrying necessary tools, tackle, skids and similar articles. Data and photograph were furnished by Material Division, Air Corps, U. S. Army.

WOMEN GIVE BODY

Opinions Rendered in Judging Delivery Trucks From 11 Western States on Appearance Give Idea of What Appeals to the Public Eye

THAT attractive delivery equipment is a distinct business asset, paying big dividends by attracting and holding customers, has long been sung by merchandising truck salesmen and recognized by alert operators. Evidence of owner effort to build prestige by appealing to the eye is manifest everywhere. This effort has resulted in trucks with artistic color combinations, graceful lines, pleasing lettering, delightful letter and color schemes, balance, simplicity, etc. But, with all this, one question remained until now unanswered—What does the public think of the trucks that are supposed to appeal to it?

A satisfactory answer would, of course, serve as a good guide to truck owners and salesmen. A verdict based upon a national or even sectional survey is naturally out of the question, but an expression from a representative group in any community is always available. The latter was recently resorted to in San Francisco when the *Pacific Laundry Journal* conducted a laundry body appearance contest. Although the contest concerned laundry trucks, the opinions rendered are significant in any vocation.

Twenty women, all of them officers and members of the Outdoor Art Department of the California Club of San Francisco, were chosen to act as judges. There should be no hesitancy in granting their qualifications to act as a representative group, and their views, therefore, become an excellent guide for truck salesmen, whose success depends on their ability to advance good and sound ideas to prospects on all phases of their business.

The contest was divided into two groups, a general and a major fleet group, the latter being confined to laundries operating 10 or more units of the same make and design. Contestants, if eligible, were privileged to enter in either or both groups. Decisions were based on appearance, involving consideration of such factors as color combination, lettering, body design and general harmony.

The judges examined and studied more than 50 delivery trucks used by laundries in 11 western states. They took great interest in the contest and were outspoken in their views on features that did not meet with their approval.

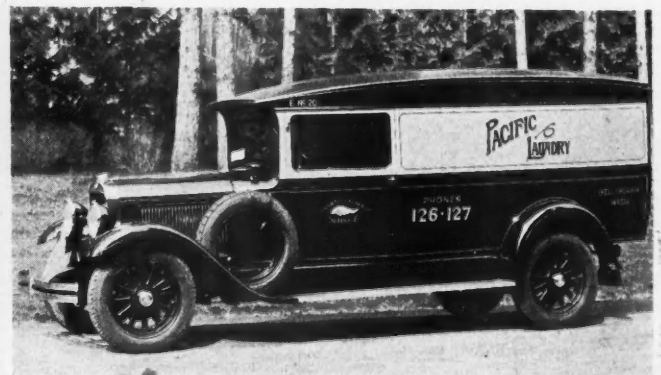
The results of the balloting follow:

General Group		
Place	Laundry	Chassis
1st	Pacific, Bellingham, Wash.	Studebaker
2nd	Crystal, Tillamook, Ore.	Reo
3rd	Cascade, Sacramento, Cal.	Studebaker
4th	Pasadena, Pasadena, Cal.	Reo
5th	Consolidated, San Jose, Cal.	Chevrolet
6th	Payette, Payette, Idaho	Dodge
7th	Crystal, Oakland, Cal.	Ford

Major Fleet Group		
1st	Ideal, San Francisco, Cal.	G. M.
2nd	City Rough Dry, San Francisco, Cal.	Dodge
3rd	Sunshine, Los Angeles, Cal.	Ford
4th	Sanitary, San Diego, Cal.	Dodge

Trucks that expressed simplicity and refinement, those which had the quieter, more subdued coloring, simple lettering and graceful body lines, were the ones that appealed especially to them. Glaring colors, a large amount of lettering, and variegated colors and lettering were vigorously disapproved. While a few

judges liked the trucks finished in white, most of them hesitated to commend them for fear that they should show dirt too readily. As for the national advertising campaign posters, the majority of the judges thought they ought to be consigned to the rubbish heap as far as their use on delivery cars was concerned. Use of the national emblem was deprecated.



IDEAS TO SALESMEN



What Women Like About Delivery Cars

A quiet, refined, elegant appearance.

Subdued colors, such as greens, grays, maroons.

As few colors and as little lettering as possible.

Just the name and the telephone number—nothing else.

Simple, uniform lettering, clear and distinct. Graceful, rounded body lines.

The word characterizing the service lettered in size equal to the name of the company.

Subordination of all lettering relative to auxiliary service so that readers will not confuse the auxiliary with the principal service.

What They Don't Like

Wild riots of color.

Big, noisy lettering.

Different kinds of lettering on the same truck.

Use of the national emblem in any form.

National advertising campaign posters.

Visors on the front of the car carrying the name.

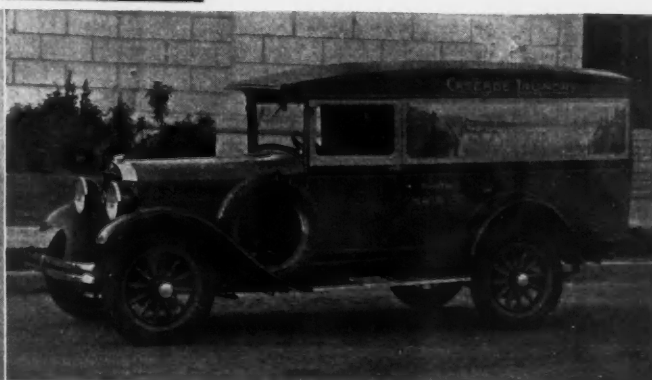
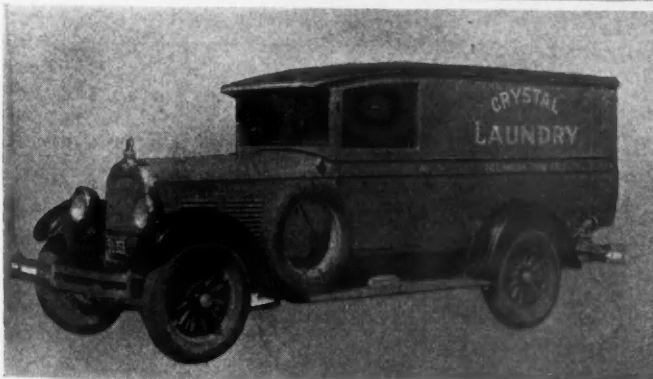
Long, square overhang on the body.

Soiled bundles anywhere on the outside of the car.

White cars—unless kept scrupulously clean and painted so often that the paint never shows the faintest trace of dinginess.

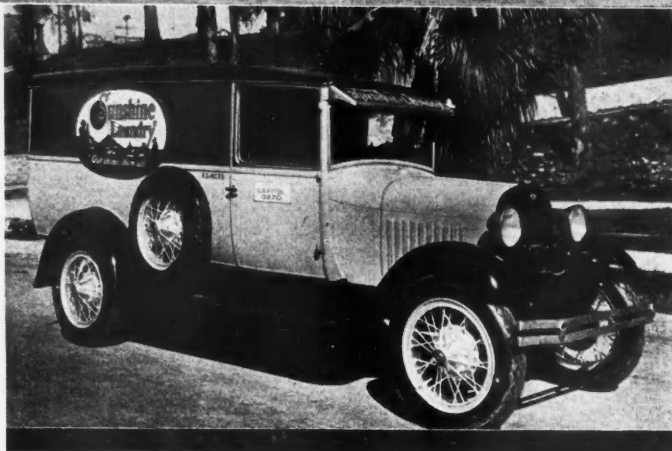
Panel below:

Entries placing in the general group.
1st, Pacific Laundry, Bellingham, Washington; 2nd, Crystal Laundry, Tillamook, Oregon; 3rd, Cascade Laundry, Sacramento





First place in the major fleet group was won by the Ideal Laundry, San Francisco, the chocolate-brown color, panel and small lettering appealing to the judges



While some of the judges commented unfavorably on the large letters on the City Rough Dry Laundry, this body took second place. Third place went to the Sunshine Laundry

The colors that seemed to them most pleasing were the greens, grays, maroons and some shades of blue. They were unanimous in the opinion that lettering should be uniform and simple and most of them thought the name and telephone number sufficient. Advertising slogans were considered unnecessary, hard to read, and tending to mar the general appearance.

The verdict on the prize-winner in the first group was that it possessed an appearance of refinement and elegance, combined life and good color, and had very graceful lines. Some judges thought there could have been less lettering on it but the color scheme of deep green for the hood, lower half of the body and the strip between the upper panel and the top, with a very light green panel carrying the name of the laundry in the same shade of green as was used elsewhere, made a great impression on them.

Second place was easily won by the Crystal Laundry of Tillamook. The simplicity of this car, colored a sand gray throughout except for black fenders and running board, red spokes and very light green lettering, appealed to them. Some of the judges liked the lettering on this better than on the Pacific Laundry truck. Others thought the color scheme somewhat drab, although it was generally conceded that the color would be very durable and that the car always would look well. One or two objected to the red spokes.

The solid green color and simple gold lettering on the Cascade Laundry truck, along with graceful body lines and generally dignified appearance, were

responsible for this entry being given third place. Opinion as to the desirability of the large picture of a big cascade of water which filled the panel was divided. Some thought it rather attractive, but others disapproved of it.

Pasadena Laundry took fourth place because of its simple, dignified appearance. This car was maroon throughout except for the top of the hood and the strip between the panels, which was a brown or gray. The simplicity of the lettering, consisting merely of the name of the laundry on the panel, with the words "dry cleaning" on the strip below, drew much favorable comment.

The Consolidated Laundry truck also seemed to express refinement, strength and dignity, according to the judges, and the uniformity of the lettering pleased them. This truck was dark blue on the lower part of the hood and body, with a light blue panel and top of the hood, while the lettering was in gold.

Although there were several white cars, the Payette Laundry truck was considered the best of this group. The fact that only two colors were used and the lettering was uniform was helpful to this entry.

Seventh place went to the Crystal Laundry of Oakland, on the strength of good color harmony between the gray body and the maroon strip running horizontally across the center. The lettering was considered good, although one judge thought that it would have been better in maroon than in the white or light gray actually used.

In the major fleet classification competition for first place honors resulted in a close race between the Ideal Laundry and the City Rough Dry, opinion being only slightly in favor of the Ideal truck. The general brown color of the City Rough Dry was commented on favorably by nearly everyone, but the large amount of lettering and the large size of the letters detracted from the appearance, they thought. The chocolate brown color of the Ideal appealed to some and did not appeal to others. Some thought the panel constituted too large a block of white and believed that less lettering would be desirable.

Third place went to the Sunshine Laundry entry, with several reservations. Several judges were afraid that the light blue used on the hood and the lower half of the body would fade out, others did not care so for the oval design on the panel. One or two noticed the lettering on the visor and disapproved of it.

The Sanitary Laundry truck was dignified, in the opinion of some, but black was held as too somber a color, and the use of the campaign poster distasteful.

A summary of the likes and dislikes of the judges is shown in the box on page 23.

WHAT'S THE LATEST DOPE ABOUT TRUCK DIESELS?

*Chats With Factory Men Produce
Opinions and Conflicting Impressions
Regarding Development Desirability*



WHEN accounts of flights of an airplane powered with a Diesel type engine appeared on front pages of daily newspapers recently, a host of trucks dealers, salesmen and fleet owners no doubt again started wondering about Diesel engines for trucks. Firmly fixed in their minds was the idea that Diesel engines were heavy, too heavy for truck use, in fact. A single flight of an airplane with a Diesel powerplant knocked the bottom out of that idea because, obviously, no successful airplane engine can be heavy in proportion to its power output.

Interest in Diesels on the part of sellers and users of motor trucks is no mere idle curiosity. Rather, it is a matter of deep concern. No salesman who is given the opportunity to sell the first properly designed Diesel-engined truck will need any pepping-up by a sales manager to induce him to gallop around his list of prospects joyfully pointing out the fuel economy of the new engine. Some far-sighted dealers already are turning over in their minds the defensive measures they will adopt if they are obliged to compete with Diesels.

Two questions arise about the future Diesel truck engine. When will an engine of this type be available for truck use, and what, if anything, is preventing this event from taking place in the very near future?

Lacking the ability of a gypsy fortune-teller, or a Hindu mystic, to read the future, no one is safe in making a definite prediction in answer to the first query, or a complete explanation for the second. If one wishes to find out, if possible, the plans of engine builders and truck manufacturers, the logical course is to go and ask for information. So

COMMERCIAL CAR JOURNAL AND OPERATION & MAINTENANCE conducted (Turn to page 60, please)

TRANSPORTATION



THE average truck prospect of today knows motor trucks. His knowledge of the various types of engines, final drives, and other units comes to him direct from the manufacturers, trade journals, truck owner associations, etc. He keeps in touch with new truck models, improvements in truck design, materials and construction because by doing so he may save money through lower operation cost or increased transportation efficiency.

When such a truck prospect adds to his fleet he generally buys; he is seldom sold. His decision to buy certain equipment is based on cold facts

brought out by a careful analysis of his transportation problem. Naturally he is influenced by such factors as the cooperation given by the truck salesman, the integrity of the manufacturer, availability of service and the truck itself.

When approaching a buyer having these habits, a real salesman of transportation is qualified to render a valuable service. By a real salesman is meant one for whom there is no "quitting time whistle" and who has the right attitude regarding the value of investigations. Such a man is out early in the morning and late at night, following

FACTS MAKE SALES

*An Article That Throws Light
on Factors That Enable the
Truck Salesman to Sell Trans-
portation Intelligently*

By Fred B. Lautzenhiser

*Transportation Sales Engineer, International
Harvester Co. of America*

What must the modern truck salesman's selling equipment comprise in a market where the average buyer of the truck knows the product?

The answer is: A thorough knowledge of transportation and how to sell it.

This article explains the seven factors involved in successful transportation selling, and tells how the salesman should proceed.

two transportation problems are exactly alike. In general, however, there are seven factors involved, which, if fully met with, will result in efficient transportation. Enumerated somewhat in the order of their importance, they are:

The commodity to be hauled.
The quantity, size and weight of the load.
The distance or length of the haul.
The frequency of trips.

Will the operation permit the use of trailers?
The nature of the road and grades to be encountered.
State laws and operating restrictions.

From these seven factors can be determined the proper transportation equipment for any purpose. Frequently, the analysis will result in entirely different equipment than that which either the user or the "consultant" had in mind in the beginning. It may result in the purchase of either a lesser or a greater number of trucks or trucks of lesser or greater capacity than was at first thought necessary. It may involve trailers, special purpose bodies or other special equipment. The tire question, itself of great importance, can only thus be solved correctly.
(Turn to page 58, please)

up truck routes, working with drivers, interviewing garage men, observing methods of handling, loading and unloading. He makes direct comparisons with similar operations elsewhere, looks for the short cuts and more direct methods by which costs can be lowered, in fact, makes a thorough analysis of the entire transportation problem.

After he is thoroughly convinced that he has something tangible worked out, something logical that will either cut operating costs or increase the transportation efficiency of a particular operation, he has a message of vital importance that the user will gladly receive.

There are no fixed rules to follow because it is seldom that

AFTER

Trailers

Visioning a future when trains of trailers will be traversing the highways of the United States from coast to coast and border to border, forward-looking truck operators and manufacturers perceive the need for a standardized fifth wheel. If they read correctly the handwriting they see on the wall, there is immediate necessity for action to promote the progress of trailer operation, which is unquestionably an important adjunct of highway transportation.

While granting that extensive development will depend upon some form of standardization, the casual observer may be prompted to dismiss the matter with, "All right, let the trailer manufacturers get together and adopt one of their fifth wheels for uniformity's sake."

Actually a settlement is not as easy as all that. Manufacturers of trailers right along have been placing the preponderance of their selling arguments on the impact-coupling features of their fifth-wheel attachments. Each has his own good reasons for believing and declaring that his fifth wheel is superior to those of his competitors. It would be too much, therefore, to ask one manufacturer to admit now, by accepting for standardization's sake the fifth wheel of another, that he had been second best all along. In effect, such acceptance would be just such an admission.

Trailer manufacturers cannot be expected to scrap their patents and the reputations they have bought for their devices by the expenditure of much money and sales effort. There can be no hope for a standardization agreement on such a basis. As matters stand the sole hope that appears to exist is for the trailer makers to continue manufacturing their present devices, and to agree upon partial standardization by means of a fifth-wheel device yet to be perfected, or by means of a return to the fundamental principle from which the present patented types were developed, and leave, as one truck factory representative suggested, the problem of means for coupling and uncoupling the trailers to truck makers for solution.

The value of such partial acceptance would lie in the fact that trailer manufacturers could continue to sell their established products to those who desire them, and offer the so-called standard fifth wheel to those operators whose operations had a need for interchangeable tractors and trailers.

Such an arrangement ought to achieve the desired end with no loss of prestige to any manufacturer.

November, 1929



Extra!

Out in Sioux Falls, S. D., there's a big haul-for-hire truck operator who proposes to inaugurate an entirely new wrinkle in truck transportation by next spring. In our estimation it will be more than a wrinkle; it will be a decided pleat carrying the idea of truck and rail coordination to the *nth* degree of application.

By means of flat cars to be leased from the railroad just as circuses lease trains, this operator plans to haul loaded trucks to various division points where the trucks will be run off the flat cars and driven around the surrounding territory making freight deliveries.

The flat-car service, it is claimed, will retain for shippers the economies and time-saving advantages of but one loading and unloading of goods, and at the same time do away with driving trucks over long stretches of gravel which at times are a most cuss-inspiring sight. (South Dakota, we are informed, has no paved highways.)

Present truck operation costs of the company average 17 cents a mile. The flat-car service will probably connect Sioux Falls with Mitchell, a town 75 miles distant. It costs \$13.09 to drive a truck from Sioux Falls to Mitchell. It is estimated that the flat-car auxiliary will cut the operation expense in half.



HOURS

Offhand we can think of a number of wrinkles in the wrinkle, but perhaps time and experience will iron them out.

Looks

If you are one of the few doubting Thomases who have yet to be convinced that good-looking truck equipment can be made a business asset, verily, verily listen to this:

A coke distributor in one of our very large cities has been vigorously selling coke as the most cleanly of fuels. Not a smudge in a carload, so to speak. He has backed up his selling with neat, aluminum-painted truck equipment, pointing to its cleanly appearance as being characteristic of the coke hauled.

Several weeks ago a cold spell hit the city in question and the distributor found himself with plenty of coke and plenty of orders, more orders in fact than his equipment could handle. So he hired equipment. And when one hires, one can't be over-particular about the looks of the equipment hired. He couldn't be, and there were some pretty crusty trucks among the hired 25 sent out to represent him.

Under ordinary circumstances the emergency might have been handled without untoward incidents. But he had sold cleanliness and appearance to such an extent that not one, but half a dozen customers refused to let the dirty vehicles stand in front of their residences and unload.

The experience, he figures, was well worth whatever it cost. Orders enabled him to gage how well he had sold the coke idea, but until his customers had complained of sore eyes, he did not know how well he had merchandised truck looks.

Verily, verily, go thou and . . . you know.

Balloons

Balloon tire talk appears at this moment to be giving the truck trade and truck manufacturers some concern.

The other day we heard a truck man declare that balloon tire talk is pure mercenary propaganda of tire manufacturers. Is it? Is it likely that tire makers think it as easy as all that to influence the judgment of chassis engineers? Is it likely that tire makers have no regard for so all-important a matter as economic value?

The answer to all three questions is an emphatic "No!" And for corroboration please see the reasoning on pages 30 and 31 of this issue.—G.T.H.

The Commercial Car Journal
and Operation & Maintenance



“We believe the Six-Cylinder Chevrolet is the most economical automotive equipment we have ever operated” — **HORLACHER DELIVERY SERVICE, INC.**
PHILADELPHIA, PENN.



Sedan Delivery **\$595**

Light Delivery Chassis **\$400**

1½ Ton Chassis **\$545**

1½ Ton Chassis with Cab **\$650**

All prices f. o. b. factory,
Flint Michigan.

WITH their own actual cost records covering a wide variety of motor trucks to guide them in their selection, the Horlacher Delivery Service, Inc.—one of the largest fleet operators in Philadelphia—have standardized on the new Chevrolet Six-Cylinder Trucks for all service up to 1½ ton capacity.

Chevrolet's outstanding appearance, its fine six-cylinder performance, as well as its remarkable economy of upkeep and operation, are the reasons given by the Horlacher Delivery Service, Inc., for their preference for Chevrolet six-cylinder trucks.

Visit your Chevrolet dealer today. Learn for yourself, from an actual trial load demonstration, how much better, faster and more economically these new six-cylinder trucks will do your work.

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

A SIX IN THE PRICE RANGE OF THE FOUR

TIRE EXPERTS SEE

Better Performance at Lower Cost Reason Advanced for Rapid Acceptance by Truck Makers and Operators

GIVERS of advice incur a special obligation to keep their recommendations up-to-date. Lawyers spend countless hours studying the most recent legislation and court decisions, doctors attend clinics, traffic officers study today's detour bulletins.

Truck dealers and salesmen are advisers, from choice and from necessity, on a large variety of subjects. An ordinary sale involves choice of type and size of chassis and body and selection of equipment. Other sales require comprehensive transportation surveys. In either case tire equipment is one of the major items considered, not alone because tire cost is a large part of operating expense, but because performance depends upon tires to a very large degree. Therefore those who sell trucks must be, and they are, ready to recommend tire equipment to their prospects. In a very large majority of cases—a tire salesman of long experience puts it at 95 per cent—the advice is accepted.

Right now is a time when anyone

who has the power to recommend or decide what tires shall be used upon any given truck, or trucks, should be very much on the alert. The respective fields of the solid tire and the high pressure pneumatic have been pretty well defined, and the cushion tire has made a place for itself to such an extent that some state legislatures have acknowledged its existence with discriminative legislation. Solid tire change-overs to pneumatics have been standardized by use of dual wheels on demountable hubs or by the cut-down method in which a new felloe band is welded on the spokes of the cast wheel. With all of these questions fairly well settled, another development comes along which is likely to reopen the whole question of tire equipment.

This development is the truck balloon which is expected to displace the high pressure pneumatic in the same fashion that high pressure tires supplanted solids. The difference between the two changes is that the balloon will take first place away from its

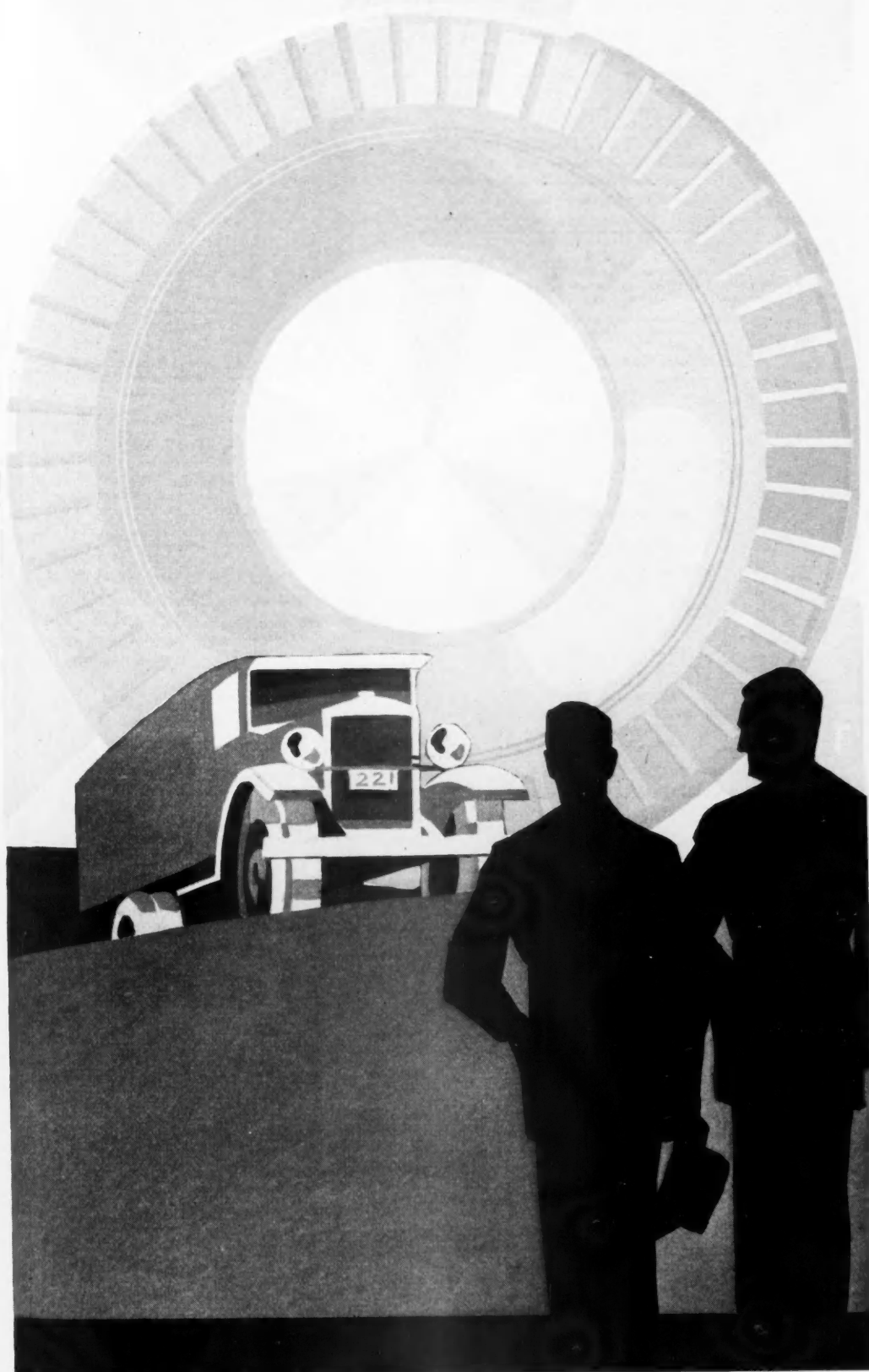
CHANGE-OVER DATA

High Pressure				Balloon			
20-in. Diameter							
Tire Size in.	Rim Size in.	Max. Load lb.	Min. Pressure in.	Tire Size in.	Rim Size in.	Max. Load lb.	Min. Pressure lb.
30x5	30x5	1700	80	7.00-20	32x6	1700	50
32x6	32x6	2200	90	7.50-20	32x6	2200	60
34x7	34x7	2800	100	8.25-20	34x7	2800	60
				9.00-20	34x7	3500	65
36x8	36x8	3600	110	9.75-20	36x8	4200	70
38x9	36x8	4500	120	10.50-20	36x8	5000	75
24-in. Diameter							
36x6	36x6	2500	90	8.25-22	36x7	*2800	60
38x7	38x7	3200	100	9.00-24	38x7	3500	65
40x8	40x8	4000	110	9.75-24	40x8	4200	70
42x9	40x8	5000	120	10.50-24	40x8	5000	75

Some of the sizes given are just going into production and this table should be checked with tire dealer or branch before a positive recommendation is made. Balloons are available in 8.25, 9.00 and 9.75 in. sizes for 22 in. wheels. A 9-10 rim recently was adopted as standard for 10.50 balloons and 9 and 10 in. high-pressure tires.

*Use of this size tire involves a wheel change.

RISE OF BALLOONS



high pressure rival in much less time than the latter overcame the well-established solid. The changes have one similarity, in each case the tire displaced will retain a restricted field of usefulness after relinquishing first place.

When will the change take place and how long will it take? The change has already started, will be well under way next year and will be completed in from two to three years, according to executives of several tire companies. One company predicts that 90 per cent of trucks will be balloon equipped within three years. An executive of another company believes that the change will be accomplished in much less than three years, except on trucks rated at five tons or more. Another predicts some very interesting factory announcements within a few months.

Evidence that the change is under way may be found by comparison of specifications a year ago and today. Seven models on balloon tires and one on high pressure pneumatics were listed in the 1000-lb. group in specification tables of the October issue of COMMERCIAL CAR JOURNAL AND OPERATION & MAINTENANCE. In the $\frac{3}{4}$ -ton group five were on balloons and two on high pres- (Turn to page 46, please)

FLAT RATE PRICE LIST NUMBER 35

CHEVROLET AND REO

CHEVROLET

Generator-Starter

8. Charging rate, adjust All models	\$0.80
9. Generator brushes, renew 4 cylinder models	2.75
6 cylinder models	2.90
10. Starter brushes, renew All models	2.40
11. Generator, overhaul All models	7.00
12. Generator, remove and reinstall only Series V, AA, AB, AC and 6 cylinder .....	.75
12a. Generator, test, turn down and undercut commutator and renew all brushes when generator is out 4 cylinder models	4.50
6 cylinder models	4.40
12b. Renew field coils in connection with operation 12a add 4 cylinder models .....	.80
6 cylinder models	1.60
13. Starter, remove and reinstall All models	1.00
13a. Starter, test, turn down and undercut commutator and renew all brushes when starter is out All models	4.00
13b. Renew field coils in connection with operation 13a add 4 cylinder models .....	.75
6 cylinder models	1.60
14. Starter, overhaul All models	6.50
15. Bendix spring, renew 4 cylinder models	2.25
6 cylinder models	2.00

Switches, Lights, Horn

16. Starter switch, remove and re- place or renew All models	\$2.25
17. Ignition switch, renew All models	1.80
18. Test light circuit with meter for open, shorts, resistance, ground All models	1.80
19. Horn, clean, oil and adjust....	.90

Fenders, Running Board and Splashes

1. Front fenders, standard, renew All models	\$2.25
3. Rear fender, standard, renew All models	1.80
5. Running board, renew All models	3.25
6. Running board and splashes, same side, renew All models	3.50
7. Running board, splashers and fenders, same side, renew All models	6.50
8. Running board (renew) All models	3.60

Wheels

1. Wheel, one, remove and replace All models	\$0.75
2. Wheels, one, remove and re- place All models .....	.50
3. Tram front wheels All models .....	.80

NOTE

This concludes Chevrolet prices which appeared in the August, September and October issues. Unless otherwise noted, prices apply to K, V, AA, AB and AC series cars and LM, LO and LQ trucks.

Additional Reo prices are given to supplement those given in Price Lists 23, 24, 25 and 31. Reo prices will be continued in an early issue.

4. Bearing assemblies one front wheel, renew all inner and outer All models	1.60
5. Bearing assemblies, both front wheels, clean, repack and ad- just	2.10
6. Rear wheels, both, tighten on shaft All models .....	.75

Body and Frame

1. Body bolts, tighten all Delivery cars	\$1.25
Truck models	1.50
3. Body assembly, remove and re- place Delivery cars	16.00
Truck models	17.50
4. Door glass, renew All models	2.00
6. Windshield frame assembly, re- move and replace All models	2.25
7. Renew all bumpers, one door, All models .....	.60
9. Hood lacing, renew All models	1.40
10. Renew chassis frame assembly Delivery cars	40.00
All truck models	45.00

Lubrication—Tightening

1. General tightening — Includes: Tighten body hold down bolts, cowl, dash, floor, instrument board, fenders, running boards, splash and dust shields, bump- ers, sills, springs, radiator, tire carrier, rim and wheel bolts and nuts. Adjust door bump- and front and rear wheel bear- ings Delivery models	\$6.50
Truck models	7.00
2. Complete lubrication—Includes: Drain and renew lubricant in crankcase, transmission and dif- ferential. Lubricate all oil and grease cups and pressure fit- tings. Use oil can on brake clevis pins, doors, spark and throttle controls. Repack dis- tributor, steering gear and front wheels. Use penetrating oil on springs. Water battery Delivery models	3.50
Truck models	3.75
3. Lubricate all grease cups, oil cups and pressure fittings All models	1.25

REO

Front Axle

1. Axle center, remove and replace F4, T6	\$6.75
G	7.75
B, DA, DC, FA, FE, FF, FC, FD, GA, GC, GD ..	10.00

2. Axle center, remove, straighten and reinstall F4, T6	9.75
G	12.75
B, DA, DC, FA, FE, FF, FC, FD, GA, GC, GD ..	15.00
3. Straighten axle when axle is out All models	3.50
4. Knuckle kingbolts, both, remove, inspect, clean and reinstall F4, T6	4.00
B, DA, DC, FA, FE, FF, FC, FD, G, GA, GC, GD ..	5.00
5. Knuckle arm, renew one only F4, T6	1.50
All other models	1.75
6. Knuckle or axle bushings and king pins, renew both sides, when knuckles are out F4, T6	1.75
B, DA, DC	1.25
All other models	1.50
7. All axle, knuckle and knuckle arm pins, bushings, thrust bear- ings and ball studs and seats, renew F4, T6	7.75
G	8.75
B, DA, DC, FA, FE, FF, FC, FD, GA, GC, GD ..	11.00
7x. Knuckle only, renew one F4, T6, G	1.75
All other models	3.50
8. Change camber of axle center with portable press, without re- moving F4, T6	7.50
B, DA, DC	7.00
F and G models	7.50
9. Tie rod bushings and pins or ball joint parts renew and align wheels All models	2.50

Steering

10. Drag link, remove, clean and replace All models	\$2.15
11. Steering gear assembly, remove and replace (provided body or cab does not interfere) F4, T6	4.00
B, DA, DC, FA, FE, FF, FC, FD	5.25
G	4.50
GA, GC, GD	5.25
12. System, adjust at all points All models	3.00
13. Gear, adjust at gear and sec- tor only F4, T6	1.75
13a. Gear, adjust at housing only All other models	1.75
14. Gear housing assembly, over- haul F4, T6	8.00
All other models	11.00
15. Column jacket bushings, renew F4, T6	5.50
B, DA, DC (remove and re- install steering gear)	25.80
All other models	5.50
16. Steering wheel, remove and re- place All models	2.50
17. Tighten gear housing to frame All models	1.00
18. Reset steering gear arm All models	1.50
19. Check only camber, castor and toe-in. No repairs included. Check tracking of rear wheels All models	3.20

SERVICE HINTS

From Shop and Factory



Jack Causes Fire

A jack placed under an axle on an angle slipped on a concrete floor and made a spark which ignited gasoline drippings and caused a fire. This incident is reported by W. E. Warner, Brentford, England.

He suggests that whenever jacks must be placed in such a position that they are likely to slip on concrete that cardboard, wall board or wood be placed under them to prevent sparks—and fires.

Steering Gear Repair Bracket

A steering gear assembly undergoing repair on a work bench takes up a lot of room. To reduce this space required and to make the housing more accessible some shops use a bracket to which the housing is bolted while repairs are being made. The bracket consists of a wide flat strip of iron or steel bent and bolted to the work bench.

This plan has one disadvantage which is that the steering gear is in the way if a mechanic is compelled to stop work on it and start on something else.

Mounting the bracket in a socket overcomes this difficulty. In one large shop every steering gear undergoing repair is bolted to a bracket and much time saved.

\$5

Ideas for Service Hints from shop men are welcome. Tell all about the idea in shop terms and send drawing or photograph. Five dollars will be paid each successful contributor.

Ford Axle Shafts

Axle shafts and housings of Ford Model AA trucks which have separate emergency brakes on the rear wheels are different from those with the four brake system. Therefore neither housings nor shafts are interchangeable.

The longer parts are used in trucks with separate emergency brakes. Axle shafts are approximately 13/16 in. longer than shafts used in trucks which have only one brake in each rear wheel. Housings are 25/32 in. longer.

Lamp Holder

Holding a portable lamp in position so it will light under a fender is no easy job. Many of the hooks, clamps and gadgets of various kinds which serve for ordinary jobs will not serve for this job, as Jos. J. Coyle, Denver, Colo., points out.

A holder which will support a lamp under a fender and in many other out-of-the-way places is illustrated. A metal band is fashioned to fit about the socket of the lamp, much like a radiator hose clamp. The figure 8 clamp is made from an old valve spring. Three or four turns are left coiled and two ends are straightened and crossed, as shown. To one end of the wire a section of small rod 1 in. long is welded and two rods are welded to the other arm. Short pieces of rubber tubing are slipped over the crossbars. These give a good grip and prevent scratching or marring painted or polished surfaces.

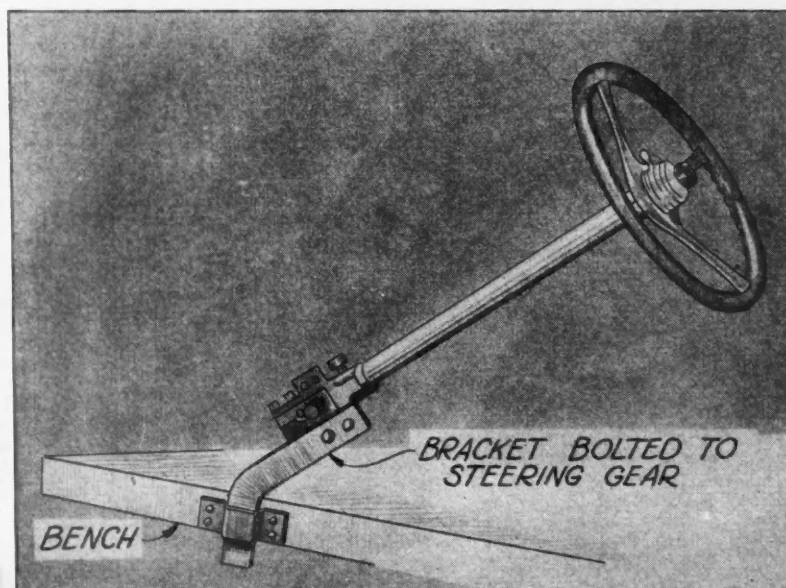
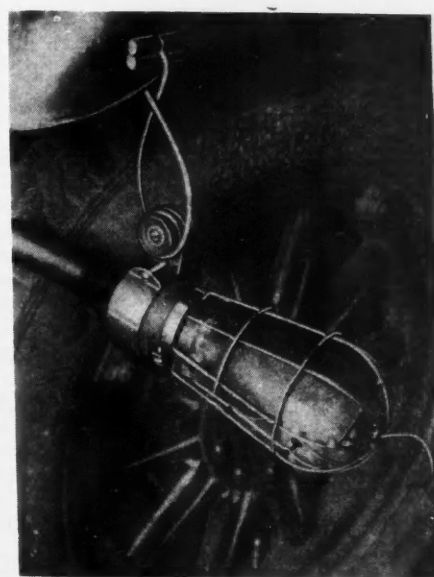
The coiled center section of the spring is inserted between the ends of

the metal clamp on the socket and held in place by two rubber washers, through which a bolt and nut are fastened.

Studebaker Front Axles

The Studebaker Corporation strongly advises against heating front axles for straightening. The factory advises if the bend is slight, it may be possible to straighten the part cold in an arbor press.

If a front axle is sprung or bent, the factory suggests that it be replaced with a service axle and the damaged one sent to the factory, where it will be properly straightened and returned for a service charge of \$2.50.



WHY WASTE FORTUNES

Hundreds of Thousands Sunk in Engineering Research Can Be Scrapped by a Mechanic Who Ignores Service Instructions

THE factory service engineer was displeased. In fact he was as sore as the proverbial poisoned pup. "The servicing some mechanics give a truck," he was saying, "makes me sick." Here he indulged in an expressive gesture denoting extreme nausea, one hand going to his forehead and the other to the pit of his stomach while his eyes rolled ceilingward until only the whites showed. His pain was plain to be seen. We offered him an aspirin tablet which he laughingly refused and then proceeded with his grievance.

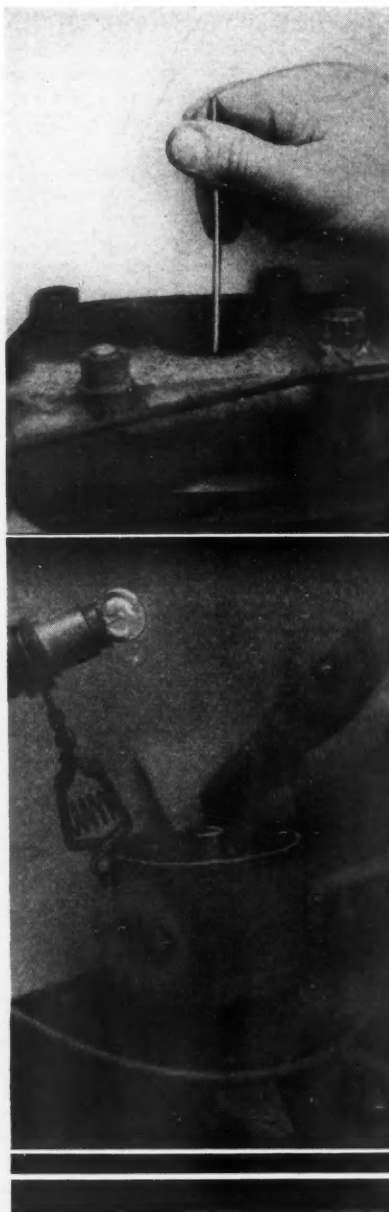
"Now understand, my complaint is not the result of long-distance diagnosis. I know what I'm talking about because I've seen with my own eyes the elementary mistakes of which many mechanics are guilty. Just recently I made a trip into the field to find out if a new model—in production for several months—was giving the performance our designers believed it capable of giving. What did I find? Well, what I found after traveling several hundred miles to run down a complaint from a good dealer will serve as a good example of what I found in a score of places.

"I was shown a truck. 'It won't pull,' said the dealer, in a tone that gave me to understand the factory was to blame. I looked it over. No wonder it wouldn't pull! I found three types of spark plugs in the same engine; tappet clearances varying from nothing to .020 in.; breaker points opening only .010 in., and one brake dragging. All due to the carelessness or ignorance of a mechanic.

"The result of this mechanic's experiment with spark plugs was that he had two squibs and four fire crackers instead of six good cylinders. Our staff spent months of time and heaps of money to work out the design of a combustion chamber that would give us lots of power without roughness. No sane mechanic would throw 1000 one-dollar bills in an open fireplace, would he? Of course not, but this mechanic threw away the benefit of research costing several times \$10,000 by using plugs not adapted to the engine. When I saw that two old spark plugs had made a total loss of our research I was peeved.

"Checking up on tappets gave me another shock. I was in no humor for telling jokes when I found another lot

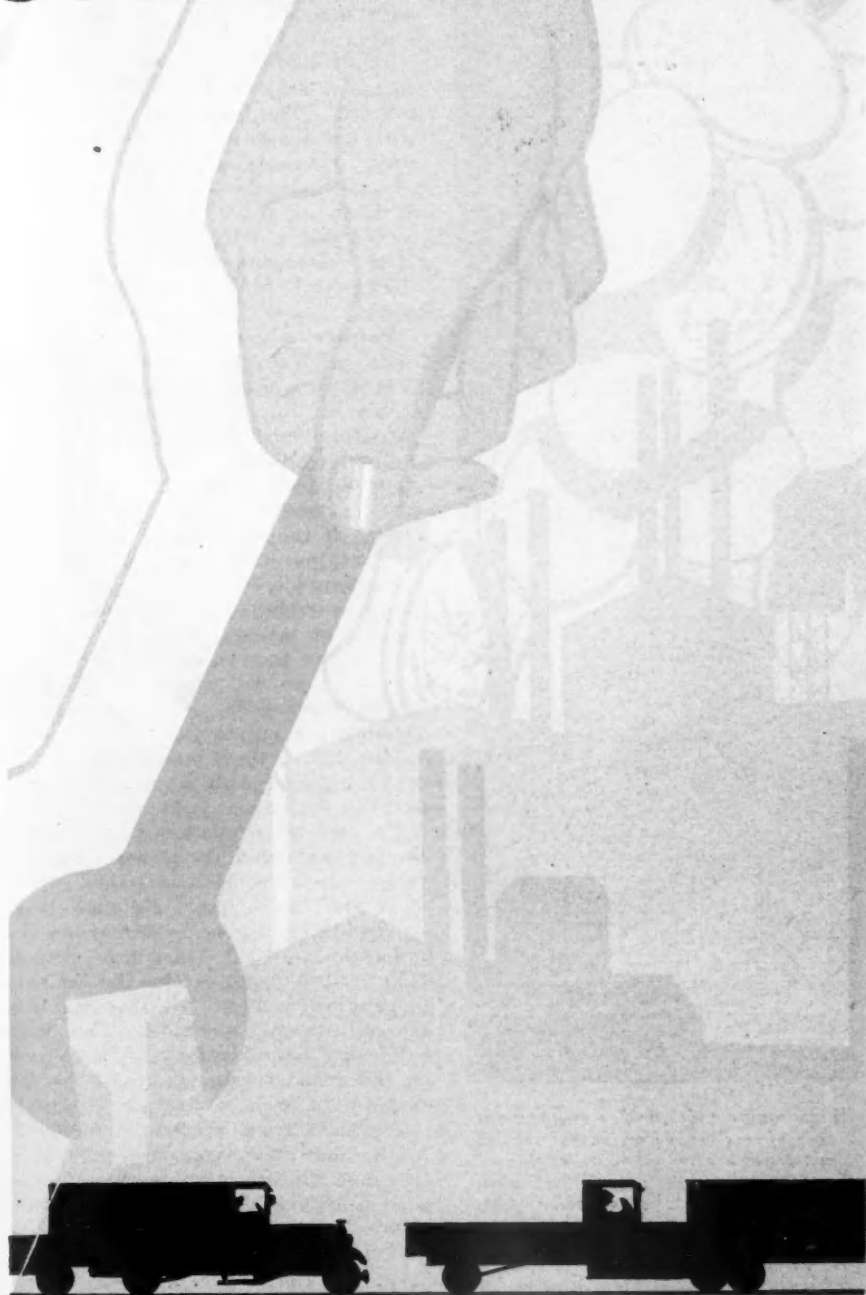
By James W. Cottrell



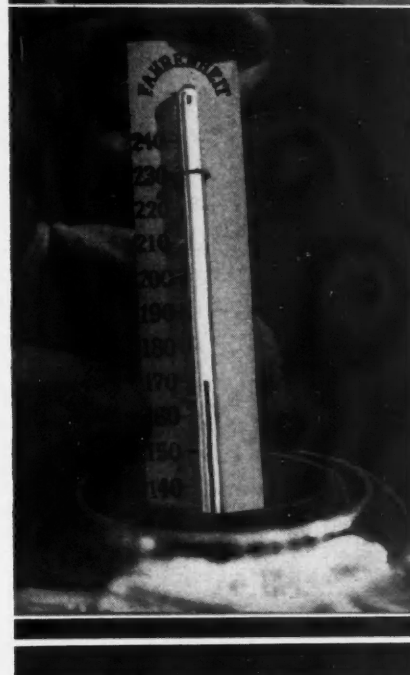
Trying to find top dead center by pushing a wire through a spark plug hole is guesswork. A careful mechanic sets ignition timing to factory standards by using a timing lamp outfit, or equally accurate means

of painstaking investigation thrown overboard without mercy. To insure long life for valves and to keep them quiet, tappet clearance must be set correctly. That is like saying that two plus two equal four. No one disputes it. But what about the effect of tappet clearance on valve timing? We, in the factory experimental department, do not guess about valve timing. A high school student could suggest a valve timing which would make an engine

SPENT BY FACTORIES?



Temperature affects tappet clearance, therefore when a tappet is set "engine hot" a thermometer is used to measure that temperature just as a feeler gage is used to gage clearance



run. Owners demand a lot more than 'just running' nowadays. Valve timing which gives best results under conditions under which the engine is likely to operate is what we are after. We go after it by carefully working out a design and then checking it by dynamometer and other tests. Perhaps some change is suggested, we try that out, make another change and put it through the tests. When we finish we know what the valve timing should be. The timing is based upon a certain fixed tappet clearance. In fact the tappet clearance which we recommend is no more subject to change than the position of cams on the camshaft.

"This mechanic who put me in such good humor had no clearance on one

valve and up to .020 in. on the others. Another engineering study cast to the winds. What happens to the timing in the cylinder with too much clearance? First of all the valves open late and close early and this reduces power. The second fault is that the valves are hammered open instead of being pushed open. Part of the cam has a gradual incline to take up the tappet clearance and this is followed by the sharper incline which lifts the valve. When clearance is too large the gradual incline does not take up all of the space between valve stem and lifter, or rocker arm, and the remaining clearance is taken up with a bang.

"The valve with no clearance will not last long. It is opened by the gradual

incline on the cam and incandescent gas which leaks through before the valve is fully opened burns valve head.

"Temperature of the engine affects clearance, therefore, we specify that tappets shall be set to so much clearance 'engine hot.' That alone will not do. On my trip I found a man setting tappets on an engine which was hardly warm from running a few blocks to the service station. Hot means hot, not warm or pretty hot. Hot means a certain temperature on a thermometer.

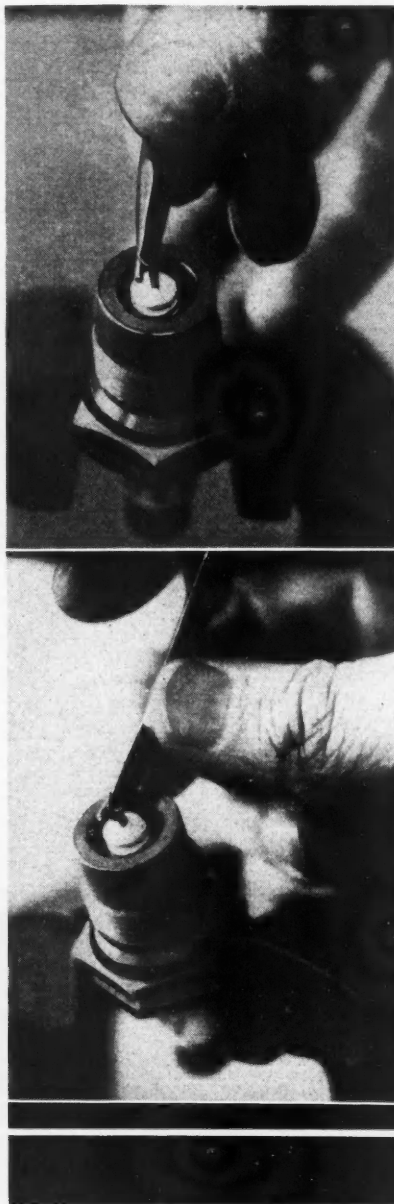
"Timing ignition is another job in which mechanics sometimes wreck engineers' calculations by carelessness or guesswork. To establish the timing range for a new engine entails no end of labor. Compression ratio, fuel characteristics, combustion chamber form, torque curves, weight of vehicle and rear axle ratio are but a few of the factors considered in determining the best timing and the rate of advance for semi-automatic or automatic equipment.

"Imagine the feelings of an engineer who has taken part in such an investigation when he sees a mechanic trying to find top dead center by pushing a wire through a spark plug hole. The flywheel can be rocked many degrees either way without moving the piston far enough for the mechanic to detect any movement. Watching breaker points open to fix the firing point is guesswork. Automatic spark advance will cover up some inaccuracies but the harmful effects of a late spark still remain, particularly at high speeds.

"Understand me, I am not finding fault with all service men. We have a fine group of dealers, service managers and mechanics, interested in the factory's policy of service. However, there are some who cause us trouble because they don't know, don't care, or are forgetful at times. An engine tune-up is a simple job, well within the capability of any good mechanic. It means so much to the truck owner that all concerned should be more than careful to see that it is done right. Right here in our own organization I find several who failed on an A-B-C job like an engine tune-up. Cottrell, you get around to see a lot of dealers and service men. Check up on engine tune-ups on a few calls and see if I am not right."

The check-up presented no difficulties.

The factory engineer is wrong if he believes that any considerable percentage of service men do not know how to tune an engine. The majority do know. Let us forget the minority, for the moment, and see how an engine tune-up is turned out in an up-to-date shop. Suppose we take a number of shots with a movie camera in several shops, large and small, then take the film to the cutting room and make up a single reel. When we show the reel let's reserve a seat for the factory engineer.



"Two squibs and four fire crackers instead of six good cylinders" result when plugs are mixed in an engine or the spark gaps are set any old way. Mechanics know that a feeler gage, not a screw driver, should be used to set gaps

First shot shows a mechanic pulling high-tension wires off plugs and removing the plugs with a socket wrench. After cleaning the plugs he sets each gap with a feeler gage or spark gap gage by bending the side wire, not the center electrode. If there are any odd plugs in the set he replaces them with the proper type. He knows that the same type of plug should not be used in all engines, but all plugs in one engine should be the same.

Continuing with the job he takes off the distributor cap and removes the rotor. Then he turns the engine over slowly, or has someone turn it, until

the breaker points are fully open. He checks the gap with feeler gage or ignition gage and sets it to the opening specified by factory. If points are worn or pitted, he grinds or replaces them with new points and sets the gap to standard.

Ignition timing is next, and he attaches a lamp testing outfit to the distributor. The instant the lamp lights, with ignition switch ON, the points are open. He spots spark timing mark on flywheel and checks this against flicker of lamp as spark is advanced or retarded just a trifle. Or our mechanic turns the engine over very slowly and checks flash of lamp against flywheel mark.

Before doing anything to the carburetor he drains the sediment bulb or fuel filter, cleans the vacuum tank screen or fuel pump screen and the carburetor inlet screen, if any.

Checking valve tappets is a part of a complete engine tune-up, although adjustment may be another flat rate operation. If tappet clearance is given for cold engine, the usual standard for L-head engine, the mechanic makes this check near the end of the job so that the engine will be cool. In case the engine has been working hard for a long time he will allow it to cool off before starting the engine tune-up, if possible. If tappet clearance is given, engine hot, tappets are adjusted first or not until all other work is completed and the engine can be started.

On the screen appears a close-up of the mechanic while he places a strip of feeler stock between an inlet valve stem and the tappet. He uses long-handled tappet wrenches and brings the tappet up until the feeler gage strip is held firmly but not pinched by the tappet and valve stem. He then tightens the adjustment, checks it again with the feeler. Another feeler strip is used on the exhaust valve gap and the job repeated on each of the valves in turn.

The next scene shows the mechanic picking up the spark plugs one at a time and placing them in the cylinder head. After each plug is screwed into position with a socket wrench he gives an extra pull on the wrench handle to make sure that the plug is seated gas-tight.

Some time during the job the fan belt is checked and adjusted. The hero of this maintenance story does not pull the fan belt as tight as he can, but on the contrary he makes the adjustment loose, rather than tight. In fact, he pulls the belt too tight and then slacks it off to proper running tension.

The hood is still up and the mechanic starts the engine and makes a general inspection to see that everything is running properly. If the engine is of the overhead valve type and tappet adjustment is to be made with engine hot, he

(Turn to page 46, please)

WHITE DESIGNS DE LUXE JOB FOR LINE WORK

A TOWER truck which combines the smart appearance of a de luxe delivery car with the utility of one-man operation of the hydraulic tower hoist was recently developed by the White Co., in conjunction with engineers of the Cleveland Railway Co.

The average tower truck is far from beautiful; the tower looks like scaffolding built on the chassis and the body, with tool boxes, wires and tackle exposed to view—and weather—adds nothing to the looks.

In the de luxe White tower truck the delivery car body not only is attractive in appearance but it provides inclosure for tools and space for three workbenches. Thus equipment is protected from the weather at all times and may be locked up when not in use.

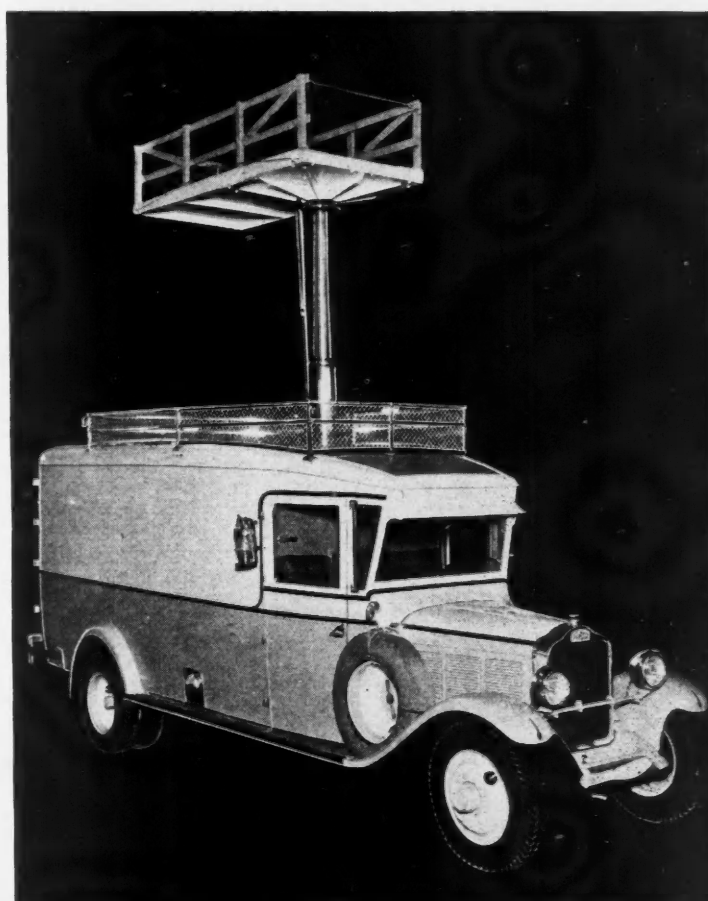
The tower is mounted on the frame directly in back of partition at the rear of the driving compartment. The assembly embodies a Wood hydraulic cylinder 7 in. in diameter with a 5-in. hollow piston. The gear pump is driven from a power take-off. Working platform is of swivel design, 9 x 4 ft., of wooden construction with steel brace rods and high double guard rails. It is insulated between platform and base plate.

Lowered in carrying position the top of the platform is 10 ft. 3 in. from the ground and when fully elevated reaches a height of 17 ft. The tower can be operated from the top of the platform or from control levers in the driver's compartment, providing for one-man operation. Full elevation of the platform requires 40 seconds.

The chassis is a White Model 51-A which, however, is equipped with a Model 58 front axle to assure easy steering and shorter turning radius in traffic.

Exhibited at the recent A.E.R.A. show in Atlantic City this tower truck attracted much attention.

Tower Truck With Wood Hydraulic Hoist Sports Smartness and Utility



Right, above: A door in right side of partition in rear of driver's compartment gives access to interior of the body. There are also two doors in the rear. Inside the body tool and parts cupboards may be built and there is room enough for three work benches. Contributing to smart appearance are the spare tires in fender wells, disk wheels, panels extending to running-board height, belt line carried forward to radiator, chrome-plated exterior metal parts, forwardly inclined windshield and bus-type front marker lights. Right: When lowered into traveling position guard rails of the platform are placed out of the way and the assembly is almost concealed by the screen which resembles a bus baggage rack

MACK POWERS BC

A NEW model six-cylinder fast truck, designed to carry loads of 2½-tons and to keep up with ordinary passenger car traffic on country roads, as well as city streets, is the latest offering of Mac. Although the new truck is offered with either dual-reduction gear or chain drive, as is the case with the Mack AB, and its carrying capacity is within the range of other Mack models, the BC truck, as it is designated, does not replace any present Mack model. Designed to operate at high speed, it is powered with a 4 by 5½ in. engine, developing 100 hp. at 2400 r.p.m., a comparatively fast rear axle ratio of 6.69 to 1 and four-wheel internal brakes, operated mechanically with vacuum booster.

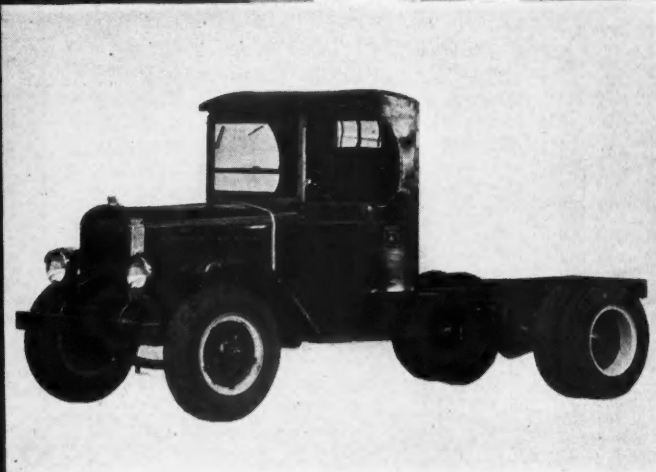
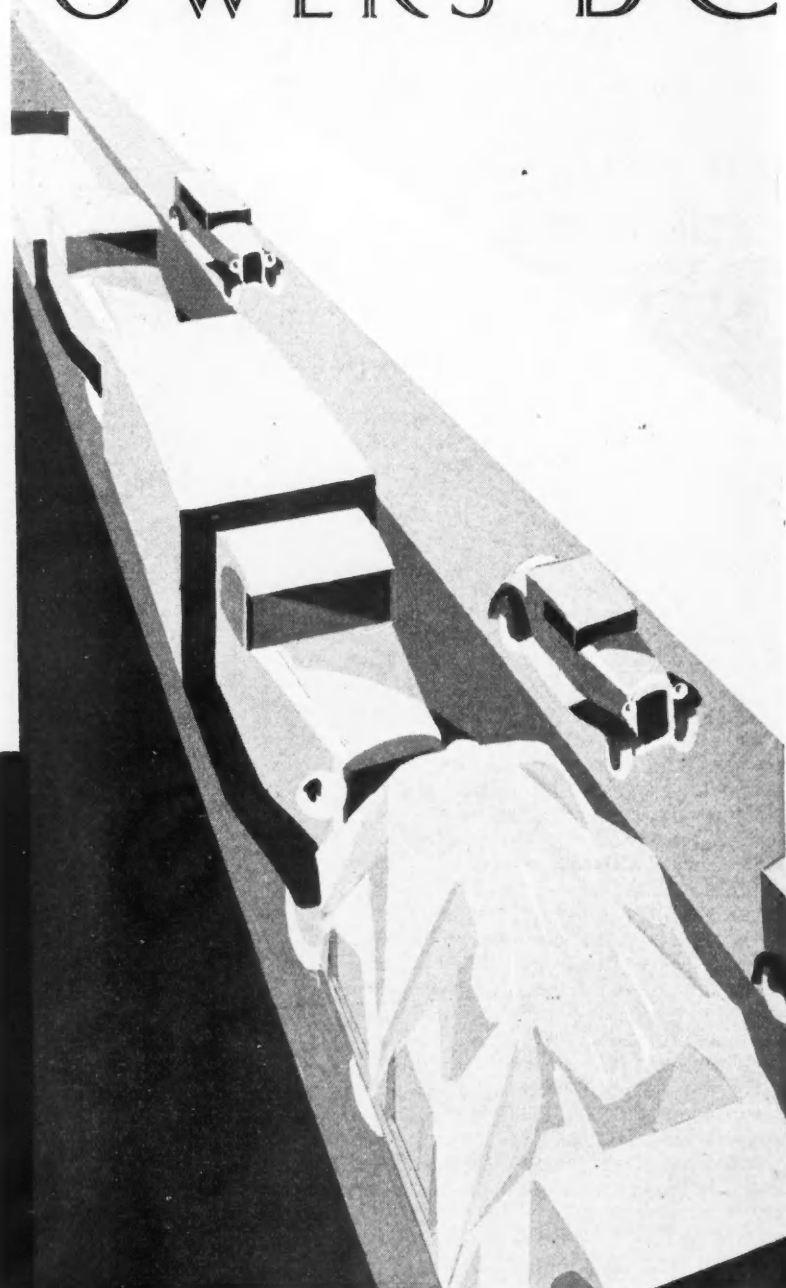
Combined fan and water pump, mounted on front of the cylinder block, crankcase ventilation and throttle-controlled exhaust heat about the vertical section of the intake pipe and a high-pressure oiling system are but a few of the interesting features of the new engine.

With a displacement of 414.4 cu. in., the engine develops maximum torque of 276 lb. ft., at 1400 r.p.m. Power output is 95 hp. at 2000 r.p.m. and 100 at 2400 r.p.m. Compression ratio is 4.8 to 1. Cylinders are cast in block with a separate single head. Pistons are light weight cast-iron type, 5 in. long. Piston pin bosses are diamond-bored. Pins, which are full-floating, are 1½ in. diameter and 3⅝ in. long.

Connecting rods are tubular, machined all over, and are made of drop-forged molybdenum steel. Bearings are direct-babbitted and are diamond-bored, diameter being 2½ in. and length 1 13/16 in.

Camshaft is mounted in four bearings, and is 1¼ in. in diameter. Valves are at right side and have flat seats, inlet is made of chrome nickel steel and exhaust of chrome silicon steel.

Below: Two views of Mack BC chassis, shaft drive



WITH 100 HP. SIX

Specifications of BC Mack Trucks

Model	dual reduction	chain drive
Capacity	2½-3 tons	2½-3 tons
Wheelbase, standard	154, 172	154, 172
Wheelbase, special	190	190
Tires, front standard	36 x 4 solid	36 x 4 solid
optional	36 x 8 pneu.	36 x 8 pneu.
Tires, rear	36 x 8 solid	36 x 8 solid
optional	36 x 8 dual pneu.	36 x 8 dual pneu.
Engine, model	Mack BC	Mack BC
size	6-4 x 5½	6-4 x 5½
displacement	414.4 cu. in.	414.4 cu. in.
hp. and r.p.m.	100 @ 2400	100 @ 2400
Number of main bearings	7	7
Diameter of main bearings	3 in.	3 in.
Piston material	cast-iron	cast-iron
Compression ratio	4.8 to 1	4.8 to 1
Oiling system	pressure	pressure
Carburetor, make	Stromberg	Stromberg
size	1½ Duplex	1½ Duplex
feed	vacuum	vacuum
Ignition	Northeast	Northeast
Generator	Northeast	Northeast
Starter	Northeast	Northeast
Gasoline tank, location	under seat	under seat
capacity	35 gal.	35 gal.
Radiator, type	tubular	tubular
temperature control	thermostat	thermostat
Clutch, type	plate	plate
Transmission, make and mounting	Mack unit	Mack unit
Universals	Spicer	Spicer
Rear axle, make	Mack	Mack
type	dead	dead
drive	chain	chain
Steering gear	worm and sector	worm and sector
Service brakes, make	Mack	Mack
location	4 wheels	4 wheels
type	internal	internal
method of operation	mechanical	mechanical
auxiliary operation	vacuum	vacuum
size of drums, front	17 x 3	17 x 3
size of drums, rear	18 x 3½	18 x 3½
Hand brake, make	Mack	Mack
type	drum	drum
size	11 x 6 in.	10 x 4 in.
Springs, front	42½ x 3	42½ x 3
leaves	12	12
Springs, rear	56 3/16 x 3½	48 x 3
leaves	11	14
Frame, type	flexible	flexible
depth, front	tapered	tapered
depth, middle	4½	4½
depth, rear	8 in.	8 in.
width, front	6 3/16	6 3/16
width, middle	2¼	2¼
width, rear	¼	¼
the	steel spoke	steel spoke



Right, above: Crankcase ventilation is provided by a flexible tube extending from the valve cover plate to the elbow on the carburetor air intake. Air entering the carburetor is filtered through an Air Maze cleaner. Pressure lubrication system operates under a pressure of 55 lb. and extends to main connecting rod and camshaft bearings. Acceleration is mounted in a bracket bolted to the cylinder

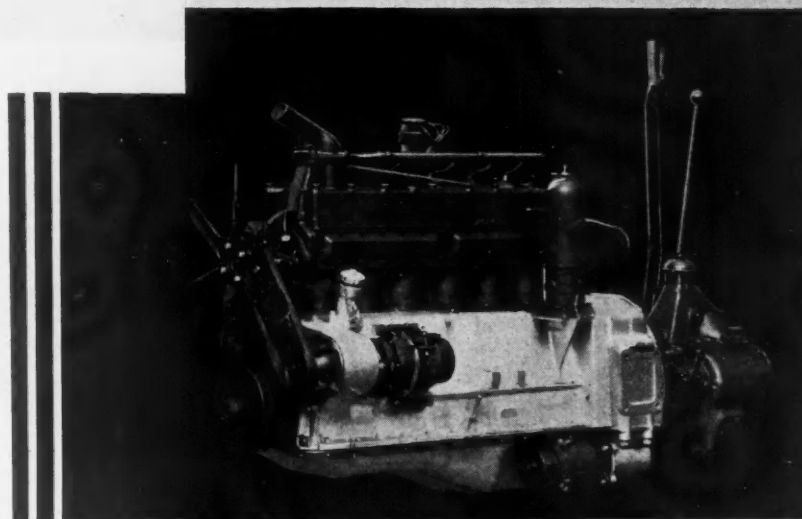
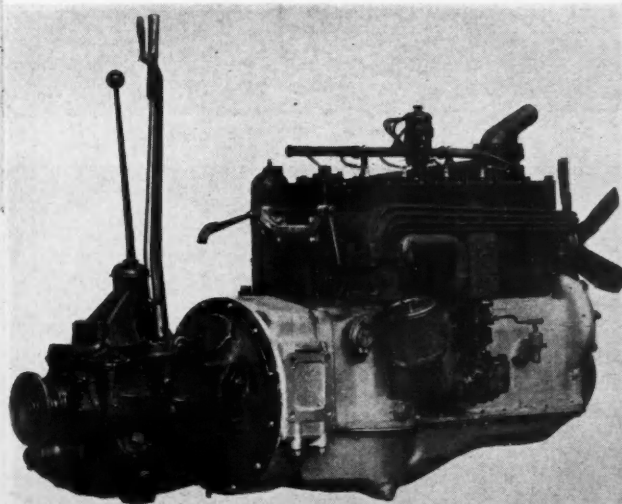
Right: Crankcase extends below center line of crankshaft for greater rigidity. The fan and pump are driven by belt from the generator drive shaft. The H. W. Filtrator is placed on a bracket just forward of the flywheel housing. Water jacket space may be cleaned through openings under two covers bolted to cylinder block. Passage extending through cylinder block and head to top water outlet by-passes water until engine reaches operating temperature

Rated at 2½-3 Tons, New High-Speed Model is Offered With Either Dual Reduction Gear or Chain Drive

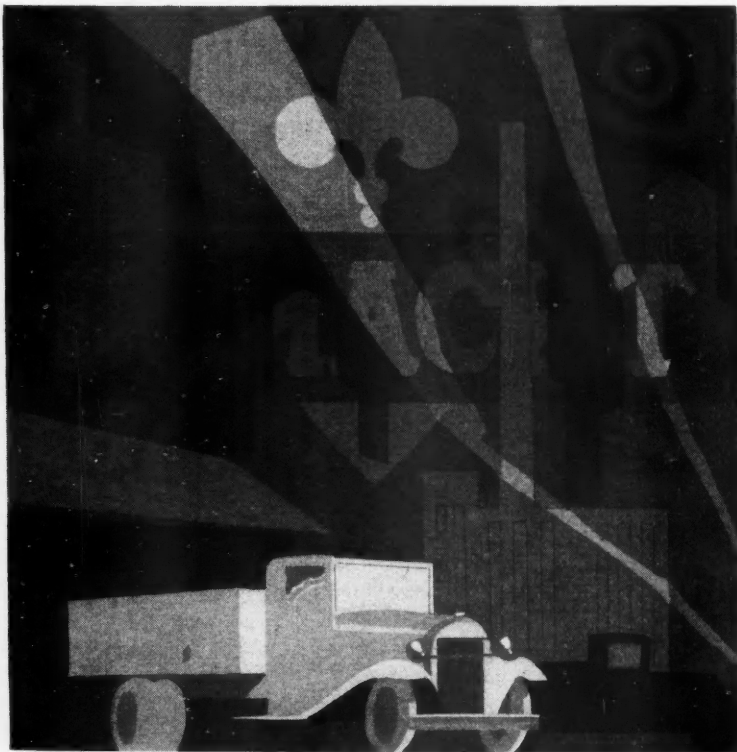
A cold circulation type by-pass is incorporated in the cooling system, set to open at 150 deg. and close at 175 deg.

Transmission is a four-speed unit, with direct on fourth. It is provided with a pyramid-shaped control assembly as well as an S.A.E. tire pump mounting, a power take-off and countershaft extension. The gear-drive model has two driveshafts with four joints. The center support of two ball bearings also carries the driveshaft hand brake assembly.

Chain drive model has a semi-floating type of jackshaft and also is equipped with four-wheel service brakes and driveshaft type hand brake.



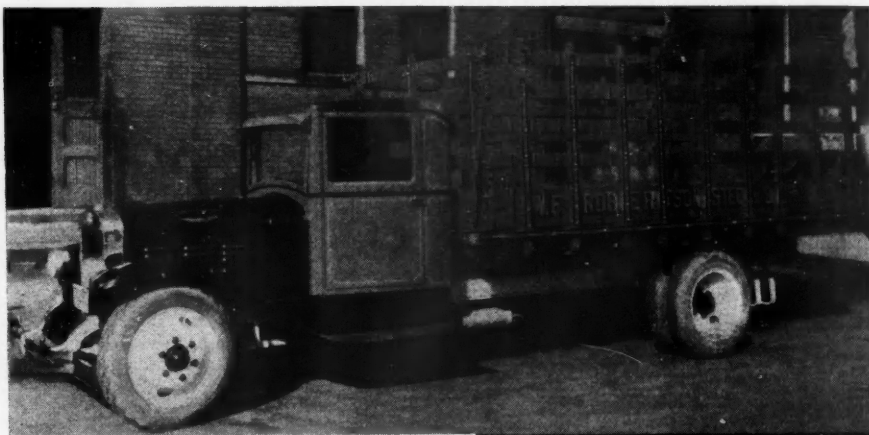
SCHACHT COMES OUT



*New Chassis, Rated From
1½ to 5 Tons, Extend
Present Line to 10 Units*

Six-cylinder engines, unit-mounted four-speed transmissions, full-floating rear axles, Spicer universals, Ross cam-and-lever steering, pneumatic tires and Lockheed four-wheel hydraulic brakes are common to all the models in the 1½ to 5-ton range.

Series 25, with a rated capacity of 3 tons, is completely new. Attractive appearance has been attained in this model by streamlining and by chromium plating the radiator, lamps and bumper. It is powered by a six-cylinder 3¾ by 4½ in. Waukesha engine with seven-bearing crankshaft. Mounted in unit with the engine is a multiple-disk clutch and a Brown-Lipe Model 35 four-speed transmission. A full-floating Timken bevel rear axle with a gear ratio of 6.17 to 1 is employed. The 7-in. pressed-steel frame is tapered and suspended on semi-elliptic springs. The Lockheed brakes are energized by B-K vacuum boosters. The hand brake actuates shoes on a drum mounted on the transmission. Radius rods are a standard feature on this model.



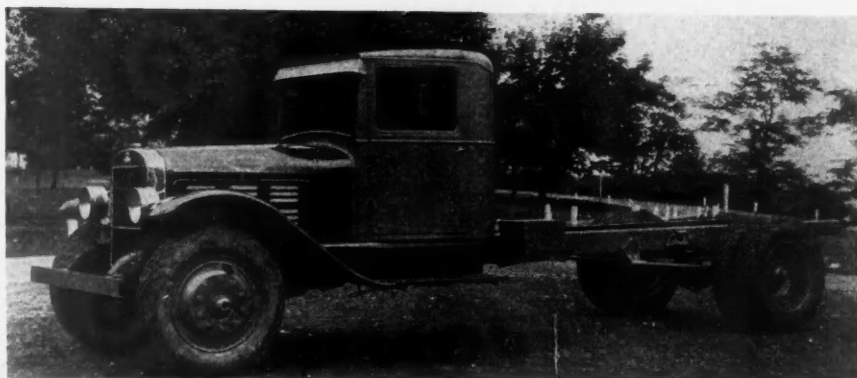
Left: Series 25, Schacht's latest 3-ton model, showing attractive streamlining. Below: Schacht Series 20 equipped with a special tank body. It has a rated capacity of 2 tons and is powered by a six-cylinder 3¾ x 4½ in. Continental engine

THE production of five new models announced by The LeBlond-Schacht Truck Co., Cincinnati, extends the Schacht truck line to 10 units. The new units, which replace former models of the same carrying capacity, range from 1½ to 5 tons, and are designated, rated and listed as follows: Series 15, 1½-ton, \$1,765; Series 20-A, 2½-ton, \$1,950; Series 25, 3-ton, \$2,295; Series 30, 4-ton, \$2,975, and Series 40, 5-ton, \$3,400. Series 20, a 2-ton chassis listing at \$1,850, is the only job in this range that continues the same as formerly. Series 60, 65, 70 and 75, the heavier units of the line, are unchanged in price and specifications.



WITH 5 NEW MODELS

Views of Schacht Series 30 and 40. Series 30, right, is equipped with a heavy double reduction Wisconsin 6.36 to 1 rear axle. Series 40, below, the outstanding heavy duty unit of the new models, is powered by a six-cylinder $4\frac{1}{8}$ x $4\frac{1}{2}$ in. Hercules engine



portioned, the Series 40 chassis is the outstanding heavy-duty unit of the new models. It is equipped with a $4\frac{1}{8}$ by $4\frac{1}{2}$ in. Model WXC2 Hercules engine, mounted in unit with a Fuller transmission. The rear axle, a double-reduction Wisconsin, Model 1427H, is stated to be exceptionally large for a truck of this capacity. The braking system is similar to that employed in the Series 30, consisting of Lockheed brakes, B-K vacuum booster and Tru-Stop disk.

The Series 20, nominally rated at 2 tons, and powered by a $3\frac{3}{4}$ by $4\frac{5}{8}$ in. Continental 16C engine, serves as a basis of Series 15 and 20-A. Series 15 has single pneumatic tires on spoke wheels, while Series 20-A has a large Timken bevel rear axle (full-floating), making it more suitable for tractor and trailer operation or light dump truck service.

The Series 30 chassis, with its 7-in. frame, six-cylinder 4 by $4\frac{1}{2}$ in. engine and double-reduction Wisconsin 6.36 to 1 rear axle, is heavier and more powerful than the former Schacht Model T. Pedal pressure of the service brake is amplified by B-K vacuum boosters. The hand brake acts on the propeller shaft through a Tru-Stop disk brake, made by the American Cable Co. Standard equipment includes 34 by 7 in. pneumatic tires, dual rears, electric lights, starter, bumper and speedometer.

Attractive and well-pro-

Specifications of New Series Schacht Trucks

MODEL	20	25	30	40
Chassis price	\$1,850	\$2,295	\$2,975	\$3,400
Capacity	2 tons	3 tons	4 tons	5 tons
Wheelbases	136-160 in. 174 in.	134-146-160 in. 174-188-199	134-146-160 in. 174-188-199 in.	134-146-160 in. 174-188-199 in.
Tires, front, standard	32 x 6 in.	32 x 6 in.	34 x 7 in.	36 x 8 in.
Rear, standard	32 x 6 dual	32 x 6 dual	34 x 7 dual	36 x 8 dual
Engine, make and model	Cont. 16 C	Waukesha XK	Waukesha 6 x 4	Hercules WXC2
size	$6-3\frac{3}{4}$ x $4\frac{5}{8}$	$6-3\frac{3}{4}$ x $4\frac{1}{2}$	$6-4$ x $4\frac{1}{2}$	$6-4\frac{1}{8}$ x $4\frac{1}{2}$
displacement	248.3 cu. in.	298 cu. in.	339 cu. in.	360 cu. in.
Hp. and r.p.m.	65 at 2600	66 at 2200	73 at 2200	80 at 2200
Lubrication, type	pressure	pressure	pressure	pressure
Carburetor, make	Zenith	Zenith	Zenith	Zenith
feed	pump	vacuum	pump	pump
Gasoline tank	18 gal.	22 gal.	22 gal.	22 gal.
location	under seat	under seat	under seat	under seat
Starting, lighting and ignition	Delco	Delco	Autolite	Autolite
Radiator	tubular	tubular	tubular	tubular
Transmission	Brown-Lipe 35	B-L 35	Fuller MGU	Fuller MGU
Speeds, mounting	4-unit	4-unit	4-unit	4-unit
Universals	Spicer	Spicer	Spicer	Spicer
Front axle, make	Tim. 12703 H	Tim. 14703 H	Shuler 5572	Shuler 5572
Rear axle, make	Tim. 54000 H	Tim. 56000 H	Wis. 8817 AL	Wis. 1427 H
Final drive	bevel	bevel	double reduction	double reduction
Type	full float.	full float.	full float.	full float.
Ratio, standard	5.83	6.17	6.36 com'l.	7.14 com'l.
optional			7.14 dumps	8.00 dumps
Drive and torque	springs	radius rods and springs	radius rods and springs	radius rods and springs
Steering gear	Ross	Ross	Ross	Ross
type	cam and lever	cam and lever	cam and lever	cam and lever
Service brakes	4 wheel—L'heed.	4 wheel—L'heed	4 wheel L'heed.	4 wheel L'heed
Operation	hydraulic	hydraulic	hydraulic	hydraulic
Auxiliary		B-K vacuum	B-K vacuum	B-K vacuum
Size of drum, front	$2\frac{1}{4}$ x 16 in.	$2\frac{1}{4}$ x 16 in.	$3\frac{1}{2}$ x 16 in.	$3\frac{1}{2}$ x 16 in.
rear	$2\frac{1}{4}$ x 16 in.	$3\frac{1}{2}$ x 16 in.	4 x $17\frac{1}{4}$ in.	5 x $17\frac{1}{4}$ in.
Hand brake, make	Brown-Lipe	Brown-Lipe	Tru-Stop	Tru-Stop
type	external	external	disk	disk
location	propeller shaft	propeller shaft	propeller shaft	propeller shaft
size	$8\frac{1}{4}$ x $2\frac{1}{2}$ in.	$8\frac{1}{4}$ x $2\frac{1}{2}$ in.	12 in.	12 in.
Springs, front	40 x $2\frac{1}{2}$ —9	40 x $2\frac{1}{2}$ —10	40 x $2\frac{1}{2}$ —10	40 x $2\frac{1}{2}$ —10
rear	50 x 3—11	50 x 3—13	50 x 3—14	50 x 3—16
Auxiliary springs	37 x 3—5	37 x 3—5	37 x 3—5	37 x 3—5
Frame, size	6 x 3 x $\frac{1}{4}$ in.	7 x 3 x $\frac{1}{4}$ in.	8 x 3 x $\frac{1}{4}$ in.	8 x 3 x $\frac{1}{4}$ in.
type	taper	taper	taper	taper
Wheels	Budd	Budd	Budd	Budd
type	disk	disk	disk	disk
Chassis weights	4500 lb.	5600 lb.	6500 lb.	7000 lb.

HERCULES BUILDS FOURS FOR HEAVY DUTY

New Three-Model "OO" Series Similar to "OX" Types

THE Hercules Motors Corp., Canton, Ohio, has developed a new four-cylinder series of L-head engines for heavy-duty service in the lower horsepower ranges. Built in three models, the new "OO" engines, as they are designated, embody the characteristics of the Hercules "OX" engines, of which they are smaller counterparts.

Except for differences in bore sizes and the parts affected thereby, the "OO" Models are identical in general design and the majority of the parts are interchangeable. The models are known as "OOA," "OOB," and "OOC," have bores of $3\frac{1}{2}$, $3\frac{3}{4}$ and 4 in., respectively, a common stroke of $4\frac{1}{2}$ in.

and develop maximum horsepower of 35, 38 and 41 at 2000 r.p.m.

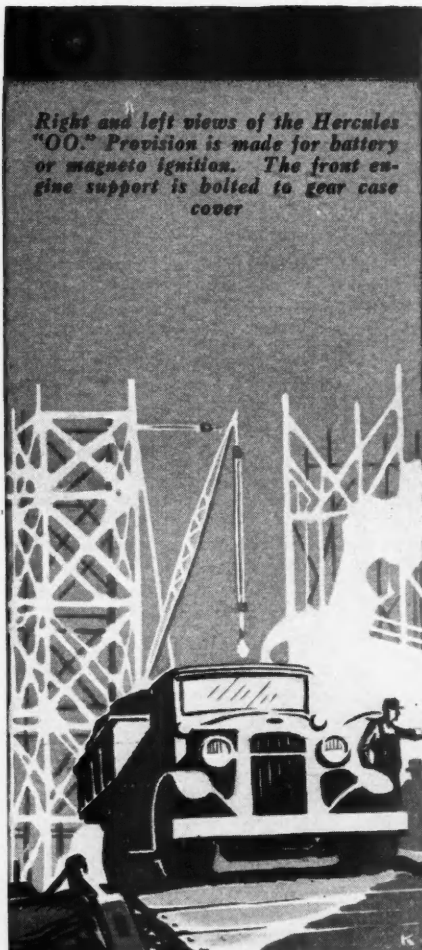
As in all Hercules engines, the "OO" Models have the crankcase integral with the block. The crankshaft is 2 in. in diameter and is carried in three main bearings. For further specification details, see accompanying table.

Water for cooling flows from a high pressure centrifugal type water pump and is directed against the valves through a passage between the valves and the cylinders. To more quickly dissipate heat, the valve ports are designed to bring the valve guides up close to the valve heads. The fan is driven by a pulley located on the front end of the crankshaft.

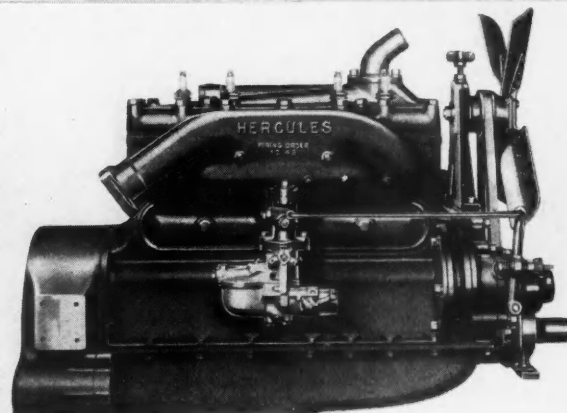
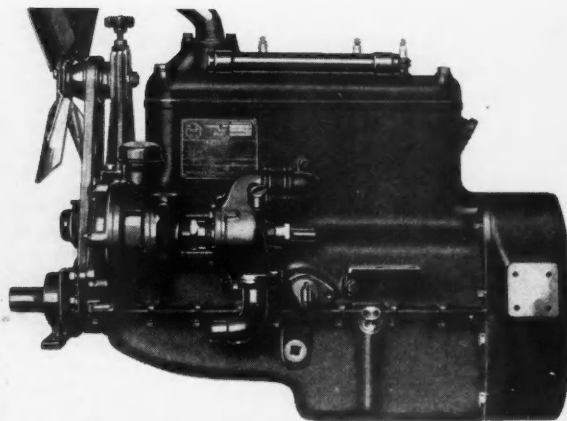
Lubrication is full force feed. The pump is located beneath the center main bearing and is driven from the camshaft by spiral gears. Oil pressure (Turn to page 46, please)

Hercules "OO" Series

Model	OOA	OOC
Type	L-head	L-head
Bore and stroke	$3\frac{1}{2} \times 4\frac{1}{2}$ in.	$4 \times 4\frac{1}{2}$ in.
Displacement	173.2 cu. in.	226.2 cu. in.
Hp. @ 2000	35	41
No. of main bearings	3	3
Size of journal	2 in.	2 in.
Length, front bearing	$2\frac{3}{16}$ in.	$2\frac{3}{16}$ in.
second bearing	$2\frac{1}{4}$ in.	$2\frac{1}{4}$ in.
third bearing	$2\frac{1}{4}$ in.	$2\frac{1}{4}$ in.
Crankcase, material	chrome nickel iron	chrome nickel iron
Oil pan, material	pressed steel	pressed steel
Connecting rod bearing, diameter and length	2 x 2 in.	2 x 2 in.
type	not removable	not removable
length, C to C	8 in.	8 in.
Valves, material, inlet	S.A.E. 3140	S.A.E. 3140
material exhaust	Silchrome	Silchrome
lift	$21/64$ in.	$21/64$ in.
size, inlet	$1\frac{1}{2}$ in.	$1\frac{1}{2}$ in.
size, exhaust	$1\frac{1}{2}$ in.	$1\frac{1}{2}$ in.
stem length	$4\frac{59}{64}$ in.	$4\frac{59}{64}$ in.
Camshaft, material	hot rolled steel	hot rolled steel
No. of bearings	4	4
drive	helical gear	helical gear
width of gear	$\frac{3}{4}$ in.	$\frac{3}{4}$ in.
Piston material	cast iron	cast iron
Pin lock in	rod	rod
Weight approximate	500 to 520 lb.	500 to 520 lb.
Suspension	3 or 4 point	3 or 4 point
Lubrication	force-feed	force-feed
Compression ratio	4.2 to 1	4.2 to 1



Right and left views of the Hercules "OO." Provision is made for battery or magneto ignition. The front engine support is bolted to gear case cover



NEW RELAY DUMP COMES IN 3 WHEELBASES

Specifications of 2½-Ton Relay

Model	50D
Capacity	2½
Wheelbase, standard	160½ in.
optional	139 in.
special	174 in.
Engine, make and model	Buda DW-6
size	6-3¼ x 5
Displacement	330 cu. in.
Hp. @ 2100 r.p.m.	70
Compression ratio	4.60 to 1
Lubrication type	pressure
Carburetor, make	Zenith
Feed	vacuum
Gasoline tank, capacity	20 gal.
Location	under seat
Starting, lighting, ignition	Auto-Lite
Radiator, make	own
type	fin and tube
Clutch, make and model	B.L. 51
type	multiple disk
Speed, mounting	5-unit
Universals, make	Blood Bros.
material	metal
Front axle, make	Timken 14704H
Rear axle, make	Relay 60
Ratio, standard	7.88 to 1
Steering gear, make	Hannum
type	screw and lever
Service brakes	4-wheel Lockheed
Method of operation	hydraulic
Springs, front, size	40 x 2¼ in.—10
Rear spring	54 x 3 in.—12
Frame, depth, stock	7 x ¼ in.
Length of dash to center of rear axle	130¼ in.

2½-Ton Model 50D Also Carries 2 and 3-Ton Ratings

THE Relay Motors Corp., Lima, Ohio, has announced the addition of a new 2½-ton truck, known as 50D, to its line. This new model, especially designed with short turning radius and weight distribution best fitted to dump truck operation requirements, is offered in three wheelbase sizes, namely: 160½ in., standard; 139 in., optional short and tractor, and 174 in., special long. This model besides its rating at 2½-tons will also carry a 2 and 3-ton rating. Prices are \$3,860, \$3,950 and \$4,050, according to rating.

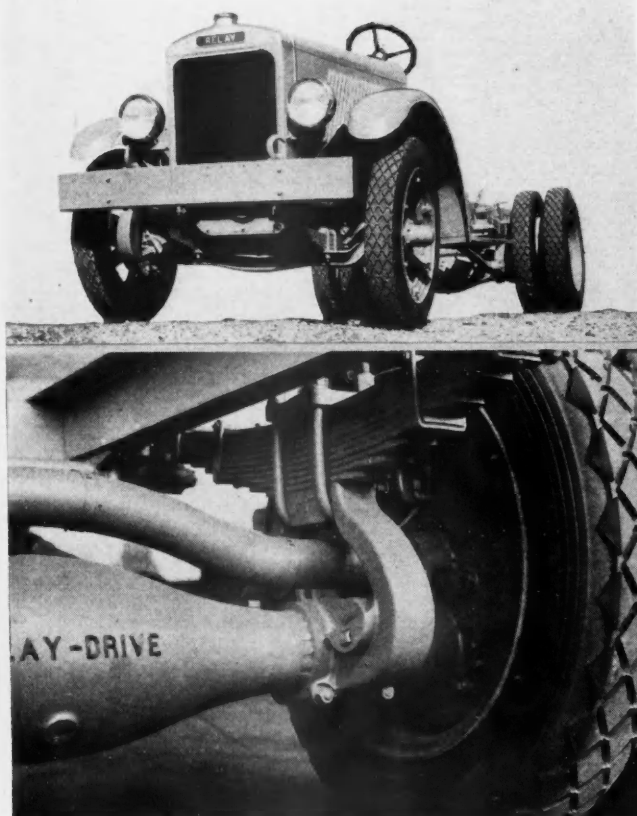
The unit embodies a six-cylinder engine, five-speed transmission, four-wheel Lockheed hydraulic brakes and Relay suspension drive axle.

Tire equipment, depending on rating, is as follows: 36 x 6 in. pneumatics front with 36 x 6 in., 38 x 7 in., or 40 x 8 in. dual rears.

The powerplant, a 3¼ x 5 in. Buda

DW-6, has a compression ratio of 4.60 to 1 and develops 70 hp. at 2100 r.p.m. It is mounted in unit with a Brown-Lipe multiple-disk clutch and Model 5 five-speed transmission. Starting, lighting and ignition are furnished by Auto-Lite equipment.

The rear axle, providing a total double reduction of 7.88 to 1 is of the full-floating type and Relay design. Drive is taken by radius rods and torque through springs. Service brakes are four-wheel Lockheed hydraulic, with 16 x 2¼ in. drums in front and 20 x 4 in. drums at rear. The hand brake, which is of Relay design, is of the external type mounted on the propeller shaft. Drum size is 10 x 6 in.



At left: Relay's new 2½-ton Model 50D dump chassis embodies six-cylinder engine, five-speed transmission, Lockheed hydraulic brakes and Relay axle

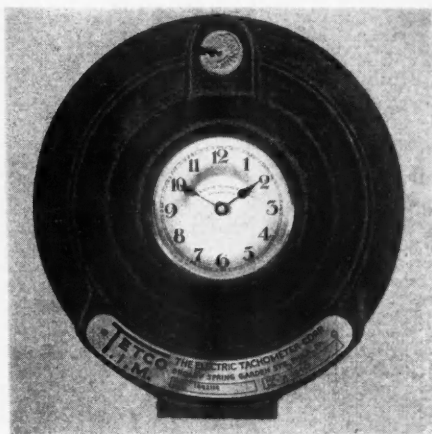
At left, below: The Relay axle upper member serves as axis for wheels, and the lower member carries the weight and encloses the driving parts



SEVEN-DAY TIME RECORDER

One Winding and One Chart Serve for Period

A NEW time recorder that gives a complete operative and idle-time record of the vehicle on which it is mounted over two, four or seven-day periods is being marketed by The Electric Tachometer Corp., Philadelphia, Pa. It is known as Tetco Tim. One chart of this instrument serves for the



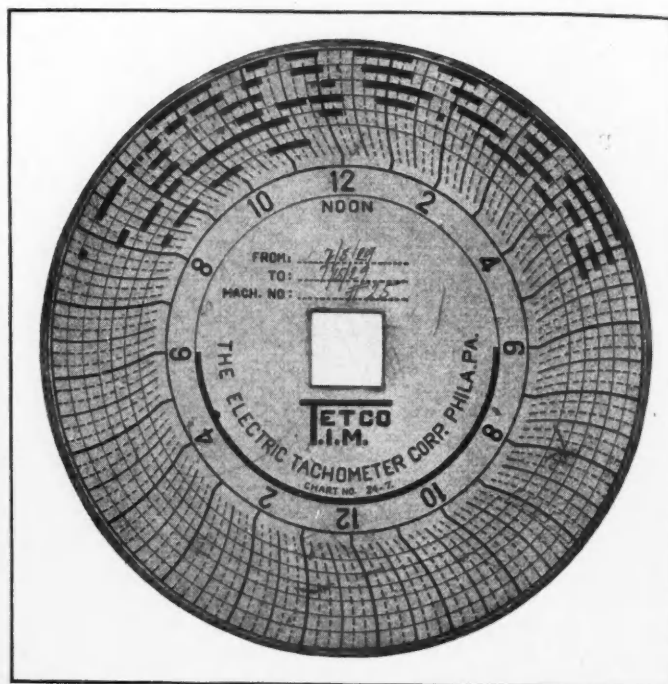
Front view of the Tetco Tim seven-day time recorder

duration of the recording period, there being a separate circle for each day's record. One day's record cannot overlap or interfere with the succeeding day's record, as each is made on a new circle. One winding of an eight-day clock is sufficient for the duration of the chart. The multi-day chart not only eliminates daily replacements, which means saving in time, effort and less charts, but permits a quick check-up and comparison between the days in the period on a single record.

An added feature is a clock dial located on the front of the instrument, which gives it extra utility and facilitates correct time-setting of the chart.

Records are made by a hardened steel stylus, actuated by the vibrations of a pendulum, which in turn is set in motion by the vibrations of the vehicle to which the instrument is attached. A heavy line scratched by the stylus in the wax-covered surface of the chart indicates time in operation. A thin line shows that the vehicle has been idle. A patented mechanism trips the stylus arm to the next circle at the end of each complete revolution of the chart.

November, 1929



Reproduction of the multi-chart showing complete seven-day record. Each circle represents one day's operation, and each small division is equivalent to 10 minutes. This chart was installed 9.35 a. m. Tuesday. Wednesday operations started at 7.37 a. m. Absence of the thin line between 11.10 a. m. and 11.50 a. m. Thursday indicates that the recorder was opened. There was no operation from Saturday 12.10 p. m. until Monday 8.10 a. m. Chart removed Monday 11.30 a. m. The chart indicates no operation during the night

DAY-ELDER

BESIDES reducing the price of several of its models \$50, National Motors Mfg. Co., Irvington, N. J., maker of the Day-Elder line of trucks, has made changes in tire sizes, frames, springs and chassis measurements for greater strength and increased carrying capacity. Other improvements include a new cab for the 1½-ton MF model and four-wheel brakes for the KF 4-5-tonner.

Tire changes provide the use of the same size singles and duals on the following models: GF 1½-tonner, 8-ply 30 x 5's; HBF 2-tonner, 10-ply 32 x 6's, and JF 3-tonner, 10-ply 34 x 7's. Budd wheels are standard on all the foregoing models. Tapered channel frames are used instead of straight-channel types on Models GF, HF, HBF, KF and 30A. On the first three models the side channel has a maximum depth of 7 in. and tapers to a depth of 4 in. at the forward and 5 in. at the rear end. In the previous frame the depth was 5½ in. throughout its length. On the other models the frame tapers from 10 in. to 4½ in. at the front and 6½ at the rear. Previously these frames were 9 and 8 in. deep. Stock 5/16 in. thick is used instead of ¼ in.

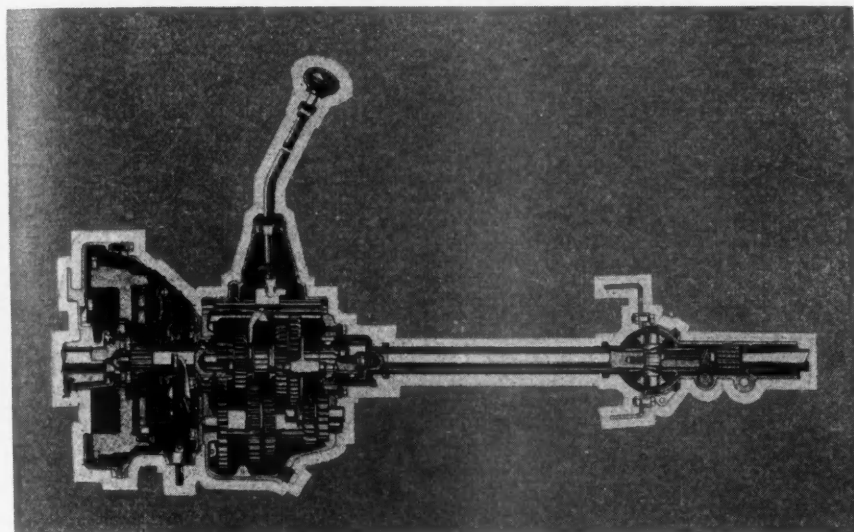
Helper springs are now used on all models. They are mounted on top of the regular springs, being held at their center by the main spring bolt. Spring ends come into play against bumper plates which are bracketed to the side frame members. Chassis changes on the GF, HF and HBF models increase the overall length 3 in. and the distance from the dash to the end of frame 4 in.

The new cab for Model MF is of the full-door type with passenger type window regulators and remote door controls. It is fitted with cadet visor, one-piece windshield and artificial blue leather upholstery.

The Commercial Car Journal
and Operation & Maintenance

FORD PUTS 4 SPEEDS ON MODEL AA TRUCK

Reduction in Low More Than Twice
That of Former Transmission



A NEW four-speed transmission is now in production on the Model AA Ford truck. Greater pulling ability in low and reverse is provided by the new unit, low gear giving a total reduction of 33.08 to 1, with a 5.17 to 1 rear axle ratio, compared with 15.95 to 1 for the former low gear. In fact reduction of the new transmission in second is just about equal to the low gear of the three-speed gearset.

Gear ratios of the four-speed set are: Low 6.4 to 1, second 3.09 to 1, third 1.69 to 1 and direct in high. Reverse is 7.82 to 1. Corresponding ratios of engine to rear wheels with high or low rear axle ratios follow:

Speed	5.17 ratio	7.25 ratio
High	5.17 to 1	7.25 to 1
Third	8.74 to 1	12.25 to 1
Second	15.97 to 1	22.4 to 1
Low	33.08 to 1	46.4 to 1
Reverse	40.43 to 1	56.69 to 1

Second speed of the new transmission occupies the same gear shift position as low of the three-speed unit. Low is to the left and forward, which was formerly reverse. Third speed is to the right and forward and high gear is the same as before. Reverse is now engaged by operating a latch on the

Cross section of new Ford model AA four-speed transmission. Anti-friction bearings are used throughout, except on reverse idler. Transmission case bolts to bolted clutch housing. At right is universal joint on forward end of torque tube. A frame cross member supports the torque tube, relieving the transmission case of this strain

lever and then moving all the way to the right and then back.

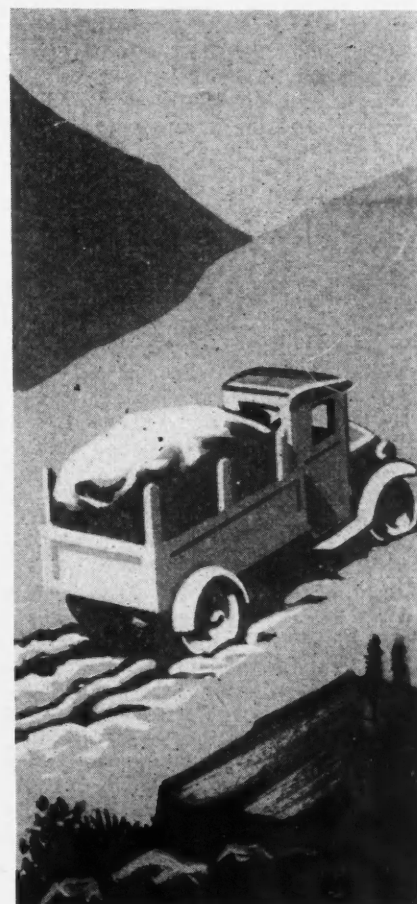
An opening is provided on the right side of the transmission case for a power take-off. Power is taken from the cluster gears. The opening is covered by a steel plate.

Gears and shafts are of chrome alloy steel, heat-treated. Roller bearings are used on the countershaft and on the pocket or spigot connection. Clutch shaft and driveshaft are mounted on ball bearings, the front bearing being an

S.A.E. 209 and the rear an S.A.E. 307. The reverse idler is carried on a bronze bushing.

An enclosed coupling shaft connects the new transmission with the forward end of the rear axle torque tube. At the front power is transmitted through an internal-external tooth coupling. These teeth permit an angular movement of five deg. At the rear is an enclosed self-centering universal joint. Center to center distance between joints is 20 in.

The coupling shaft is on a direct line with the crankshaft of the engine and instead of being parallel makes an angle of about three degrees with the top of the frame.



Why Waste Fortunes

(Continued from page 36)

covers the radiator, or closes the shutters, to bring water temperature up to standard quickly. He watches the dash engine-heat indicator if there is one; if not, he places a thermometer in the top of the radiator to determine water temperature.

When the engine is hot he adjusts the tappets, following the same general procedure as with an L-head engine except that the adjustment is at the top of push rods instead of in a valve tappet gallery.

Ordinarily, little need be done to the carburetor except to check the idling adjustment and the throttle low-speed stop screw. Idling adjustment affects the throttle position for idling speed, and after adjusting the idling mixture the mechanic reduces throttle opening with throttle on steering column closed until engine is just ticking over.

The engine tune-up job is finished, unless a road test is to be included. If there is to be no road test the mechanic makes sure that brakes do not drag and that nothing else is causing undue friction when the truck is coasting. This he does by using a brake tester, jacking up the wheels and turning them by hand or by driving the truck for a mile or two and coasting to a stop. Dragging brakes will be warm or, perhaps, hot. Or the coast itself may be a test of free running. A truck known to be free of excess friction is coasted on a level road at a certain speed, say 20 m.p.h. The distance it coasts is noted by phone poles or other distinguishing marks. This becomes a yardstick by which other trucks are gaged.

Final scene is a fade-out showing a truck leaving the service station.

Rise of Balloons

(Continued from page 31)

sure tires. All models in these two classifications are now on balloons.

Two 1-ton models were on balloons a year ago; this year five models have balloons on front tires, at least. Balloons were listed as standard equipment last month on front wheels of the Ford 1½-ton truck, and two other 1½-ton models, the Republic Fleetmaster and GMT T30-3003, also have balloons on the front.

Balloon tires will supersede high pressure tires on trucks not because of sentiment or guesswork or even for factory convenience but because they possess advantages which are important to the truck owner. This type of tire has been tested thoroughly in bus service for several years. It has also been tested in the most severe truck service. In fact some of the early tests were made by tire factories on truck installations where high pressure tires were giving lots of trouble, with consequent claims for adjustment.

Advantages of truck balloons over

high pressure tires, as revealed in these and countless other tests, are: lower cost for same carrying capacity, greater mileage, less punctures, better traction, improved cushioning effect and higher speed. When operating advantages are coupled with lower cost, as in this case, acceptance of the proposition is likely to be rapid.

Price differential in favor of the balloon tire is not uniform throughout the range of sizes. In several sizes the balloon has slightly more carrying capacity than the corresponding high pressure tire. For illustration, a 30 x 5 heavy duty high pressure is rated to carry 1700 lb., while the corresponding balloons carry 1700 to 1900 lb., and a 36 x 8-in. high pressure carries 3600 lb., with a 9.00/20 balloon rated at 3500 lb. and the 9.75/20 rated at 4200 lb. available for the same service. The 9.00/20 costs much less than a 36 x 8 and the 9.75/20 costs slightly more.

There would still be a cost advantage for the balloon if both high pressure and balloon of the same capacity were of the same price. There is general agreement among those in touch with the situation that the balloon tire gives greater mileage than the high pressure and is less subject to puncture. In many instances it has been found that the harder the service the better the showing of balloons.

Area of contact with the ground is larger for a balloon tire and this not only gives better traction but reduces skidding on slippery places. The former is important in sand and other kinds of bad going and the latter is of value on paved roads. Improved cushioning effect of a balloon is taken for granted by operators who have their own experience with passenger cars as a guide in this respect. However, in fleet operation this cushioning effect is weighed in relation to its effect on maintenance costs in addition to its ability to give driver and load a smoother ride.

With so many advantages on the side of the balloon tire the question may arise, What, if anything, is preventing this change from high pressure tires taking place overnight, so to speak? The answer is that, as in the case of other developments, many separate but related problems must be worked out before large scale production can be undertaken. Developing truck sizes of balloon tires and then working out the manufacturing difficulties took both time and money. Balloons up to 10.50 width and a carrying capacity of 5000 lb. per tire are now available and larger sizes will be forthcoming later if desired. Not the least of the manufacturing problems is that of keeping price in line with that for high pressure tires now being produced in large quantities.

Allied with the balloon tire development problem is that of wheel and rim equipment, clearance between side of tire and side of truck body and state legislative restrictions on overall width of trucks. A pair of 10.50-in. balloons with proper spacing has an overall

width of about 33 in. and two such pairs take up much of the allowable truck width.

Clearance figures are of importance in change-overs from solid tires. Many tire men do not hesitate to recommend a change from solids to balloons without the intermediate change to high pressure tires. In fact they advise the use of truck balloons in place of high pressure tires in all cases unless special conditions, such as clearances, prevent.

Change-overs from high pressure to balloon tires can be made on many trucks now in use without change of either wheel or tire equipment. The important dimensions are, of course, wheel diameter and rim width. If a high pressure tire is an oversize for the rim on which it is mounted some care should be exercised in placing a balloon on this same rim.

Hercules Fours

(Continued from page 42)

is adjustable. The breather cap is over the accessory driveshaft.

The pistons are of cast iron and carry three 3/16 in. rings above the pin, the lowermost being of the oil regulating type. Piston pins are of nickel molybdenum steel and are 1 in. in diameter and 2½ in. long in the first two models and 2½ in. in the last. Each pin is locked in the connecting rod by a clamp bolt, and is carried in two hard cast bronze bushings. Connecting rods are of "H" section. The camshaft, driven by helical gears is on the right side and rotates in four bearings. Valves are of the 45 deg. type and are operated by mushroom type tappets of nickel molybdenum steel.

The engine is supported in front by a bracket, obtainable for either three or four-point suspension, bolted on the gear cover. Provision for mounting an electric starter is made in either of the No. 4 or No. 5 S.A.E. flywheel housings supplied. The starter flange is a No. 1 S.A.E., using a 13-tooth pinion. When self-starter is desired the flywheel is provided with teeth cut directly into the rim of the wheel. In the center of the block, near the center line of the crankshaft, is an opening for attaching a pipe for thermo-syphon cooling.

Refrigeration

(Continued from page 17)

The DryIce company has licensed a considerable number of body builders throughout the country who are building DryIce bodies in accordance with the patented designs.

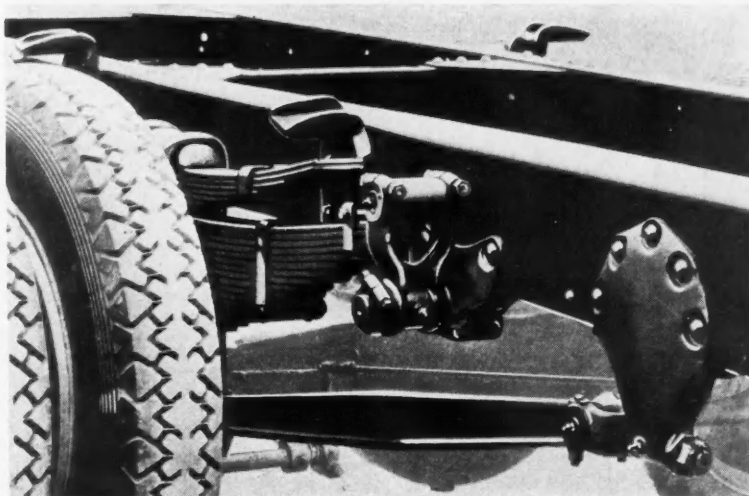
Until recently distribution of this new mobile refrigerant has been somewhat restricted to North Atlantic, New England and several Mid-West States. Production has been expanded, however, and today plants are in operation as far south as Jacksonville, Fla., and as far west as Denver. Gradual coverage of the entire country is the plan of the manufacturer.

GENERAL MOTORS OFFERS EIGHT T-60 SPECIALS

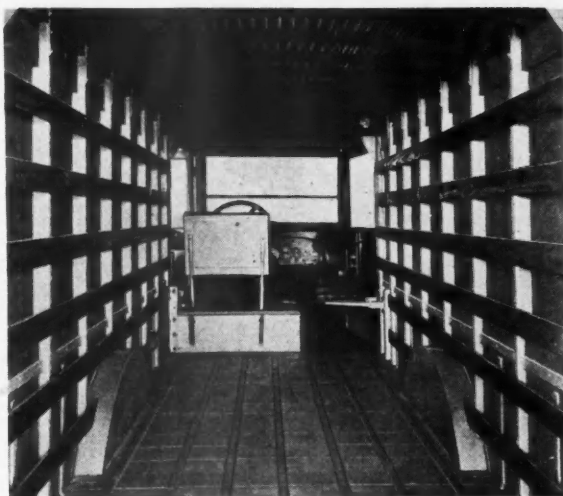
9-Ft. De Luxe Panel Body for Model T-19 Chassis Also Announced

GENERAL MOTORS TRUCK CO. announces that by the use of heavier worm-drive axles, two-stage rear springs and larger tires Model T-60 is now available in eight new chassis types. The new types are known as T-60 Specials and have vehicle gross weight capacities ranging from 19,000 lb. up to 22,000 lb. One standard and two optional gear ratios, four wheelbases, 140", 160", 180" and 200" in., and two different sets of tire sizes are built into the eight types, which are designated by numbers ranging from 6101 to 6108 inclusive.

The rear axle is a full floating, heavy duty, worm drive Timken having a standard gear ratio of 10.33 to 1; the optionals available at extra cost are: 9.00 to 1 and 12.33 to 1. The semi-elliptic, silico-manganese steel



Above: Close-up of GMT T-60 Special showing the new two-stage rear spring



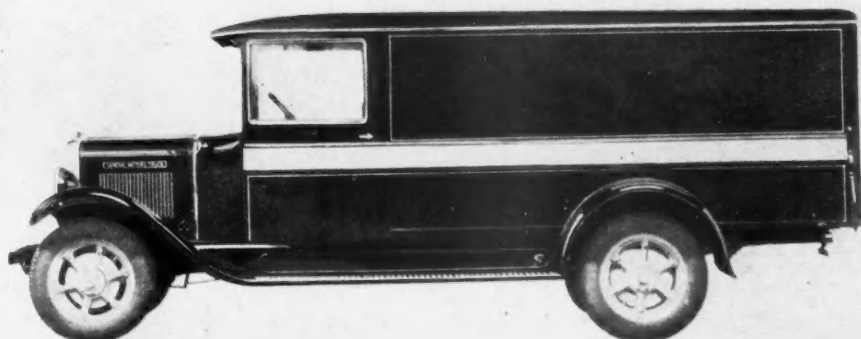
Right: Interior of the 9-ft. de luxe panel body

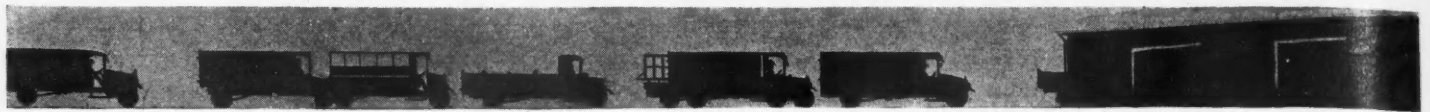
springs are made up of ten leaves, 40 x 3 in. in front, and 14 leaves, 54 x 3 in. in the rear. The rear auxiliary springs, newly added, consist of seven leaves and are 36 in. long and 3 in. wide.

Types 6101, 6103, 6105 and 6107 are equipped with 38 x 7 in. single front and 38 x 9 in. dual rear cord pneumatic tires. The other types carry 36 x 8 in. single front and dual rear.

The company also announces a new de luxe 9-ft. panel body for mounting on the 133½-in. Model T-19 chassis. Equipped with this extra length body, Model T-19 weighs 4000 lb., which leaves 2000 lb. for load. The inside length of the body is 108 in.; width, 51½ in., and height, 55 in. Rear doors are 50 5/16 in. high and 47½ in. wide. A few of the features of the body are: Corner dome light; scuff plates; deeply upholstered, slanting back driver's seat; auxiliary fold back helper's seat; order book holder; door locks and automatic windshield wiper.

Left: De luxe panel body mounted on T-19 chassis





NEW TRUCK SALES

Complete Figures for August, 1929; Totals for

		Acme	American La France	Atterbury	Autocar	Brockway-Indiana	Chevrolet	Diamond T	Dodge Bros.	Fargo	Federal	Ford	G. M. C.	Gotfredson	International	Larrabee	Mack	Moreland	Pierce-Arrow	Relay	Reo	Republic	Rugby	Schacht	Selden	Sterling	Stewart	Studebaker	Whippet	White	Willye-Knight	Total Sales by States Including Miscellaneous		
ALA.....Aug.							572		8	1	2	243	3		9		1													6	7		856	
†S mo.						5	2,083		103	8	12	1,568	47		184		12		1	21		1					1	1	30	28	1	4,120		
ARIZ.....Aug.							72		19			124	12		3			1			4		5						3	6		249		
S mo.							584		182	8		984	96		104		5	2			36		21					3	35	17	11	6	2,101	
ARK.....Aug.						2	560		20	1	1	480	5		68		1				4		1					1		11	6		1,164	
Sept.							296		12	7		232	4		43		3			2	2		1					1	1	15	4		626	
S mo.					11		1,957	3	163	12	8	2,535	57		418		7				49		3				1	8	45	39	1	5,350		
CAL.....Aug.		1			11		604	1	186	20	21	1,460	119	1	52		38	55		2	109	10	19				34	4	9	8	44	5	2,929	
S mo.	11	8			119	2	3,807	10	1,697	89	182	10,975	751	19	428		306	462	10	4	820	32	129				216	58	129	58	307	15	21,566	
COLO.....Aug.							335		54	15	2	369	25		103						10		3					1		15	5	1	941	
S mo.					1	4	1,491		304	43	18	1,754	206	1	346			11	2		1	54	3	17				1	10	40	39	5	4,364	
CONN.....Aug.					9	17	151	11	58	5	7	213	25		28	3	33		1	1	59	1	5	1			1	8	4	3	8	1	669	
S mo.					61	77	1,363	51	498	47	43	1,713	222		248	21	261		16	15	402	3	15	4	2		15	107	45	49	52	15	5,415	
DEL.....Aug.							39	1	1			65	4		5		1				2		1					1		2			122	
S mo.					12	2	354	1	36	1	1	493	61		74		5		6		30	2	5				1	2	1	4	11	1	1,104	
D. C.....Aug.					3	3	24		2		1	83	13		6		2				2							2		2	5		156	
S mo.					12	20	320	35	54		3	865	53		39		45		3	8	28					10	22		12	40		1,590		
FLA.....Aug.					6	165		14				321	16		10		1				7								2	2	8		552	
Sept.					4	141		17				237	4		17		7				7								2	1	5		444	
S mo.					25	1,150	6	96	3	2	1	2,102	58		111		24		5		47	3							22	41		3,703		
GA.....Aug.					2	11	239		25	5	3	294	7		22		2				9									10	4		633	
S mo.					8	51	1,885	1	167	10	11	2,063	45		132		29		1		29								7	38	60	2	4,543	
IDAHO.....Aug.							215		22	2		237	12		43						8		11						1	5	3	1	564	
S mo.							628	1	92	5	1	636	40		122		15	10	1		42	1	24						5	9	20	3	1,668	
ILL.....Aug.		1			6	9	720	62	93	16	6	1,094	46		146		18			2	33	1	2				10	2	1	40	19		2,412	
Sept.		1			11	5	591	51	126	16	12	923	20	1	163		8			2	51	1	5				2	1	1	41	18		2,131	
S mo.		11			70	112	5,607	784	1,170	117	103	8,233	551	44	1,715		255		11	43	408	12	39				77	24	22	202	191	22	20,611	
IND.....Aug.					1	16	558	8	65	8	5	722	40		72					2	6	35						14	6	32	1	2	1,607	
S mo.					1		10	166	3,501	57	594	29	48		4,725	370		17		5	33	287		9	4			71	65	143	58	7	10,886	
IOWA.....Aug.						9	461	2	45	10	2	371	10		138		3			2	27		5							43	4		1,141	
S mo.					1	38	3,638	17	377	55	20	2,617	108		1,067		37			13	230	3	25					1	15	129	27	6	8,468	
KAN.....Aug.						2	551	2	68	17	1	630	41		184		7				22		1					4	4	49	9	3	1,803	
S mo.					18	4,175	20	523	70	5		3,924	268		1,063		15			2	150	9	9			1		10	33	223	34	23	10,622	
KY.....Aug.						1	178		23	2	2	218	13		41		2				4	8			2					1	6	4	1	514
S mo.					7	26	1,387	20	222	20	5	1,513	147		324		40		2	14	108	4	4	21				4	18	48	36	6	4,010	
LA.....Aug.						1	316	1	24	1		404	11		73		4				2									3	4	1	846	
S mo.					3	26	1,633	14	164	5	5	2,371	93		375		23			1	21								1	20	39	4	4,903	
ME.....Aug.					1		224		32	8		173	8		37		11				29		4							1	15		546	
S mo.					7	7	1,357	11	227	21	1	1,471	54		99		26				164		14			1	4		14	37	4	6	3,539	
MD.....Aug.	1				20	13	184	9	39	6	4	296	31		42		17				20	2	2				1	2	10	3	4	16		740
Sept.	3	3	1		98	42	1,339	63	294	15	35	1,962	172		38		18				21	2					12	6		7	32		659	
S mo.	3														282		161		3	7	170	10	6			2	34	36	8	20	110	2	4,973	
MASS.....Aug.			5		30	26	242	24	112	15	11	587	72		61	3	43		1		78		4			2	19	6	6	12	19	2	1,397	
S mo.			46	24		198	158	2,498	117	950	141	111	5,163	599	1	563	34	347		16	4	368	53	14	5	13	143	69	41	80	201	16	12,335	
MICH.....Aug.					4	2	434	7	49	7	15	877	47	1	55		10			2	60	6	1					1	1	24	2	2	1,644	
S mo.			36		44	30	5,329	52	750	111	168	9,170	636	28	804		103		15	12	609	18	26	2			2	35	176	70	24	18,458		
MINN.....Aug.		2					421	2	38	12	7	555	22		123		9				27		1						1	28	9	4	1,283	
Sept.							319	4	36	12	5	519	13		112		13				18									17	12		1,096	
S mo.							2,531	14	297	27	50	3,592	170		674		33		1	5	190		10					24	115	62	13	7,865		
MISS.....Aug.						2	450		4			409	5		33						5		1							8			917	
S mo.					15		1,750		59	5		1,762	32		198		1				29		5						1	15		4	3,878	
MO.....Aug.					6	5	527	23	62	6	8	817	39		97		14			1	20	4	5				1	6	1	7	41	6	1,708	
S mo.					34	87	3,943	196	690	43	96	4,794	443		786		125		34	5	220	16	23				18	14	36	156	110	10	12,021	
MONT.....Aug.							222		28	14	8	299	9		91		4				16		3						1	11	3	1	711	
S mo.					3		858		202	24	22	1,552	8																					

† September not included in 8 mo. totals.

Figures in this table are compiled by R. L. Polk & Company, of Detroit, except Illinois, which compiled by the New Jersey Motor List Co., New Car Division, of Trenton. Readers desiring

November, 1929

The Commercial Car Journal
and Operation & Maintenance

BY MAKES AND STATES

Eight Months, and Partial Reports for September, 1929

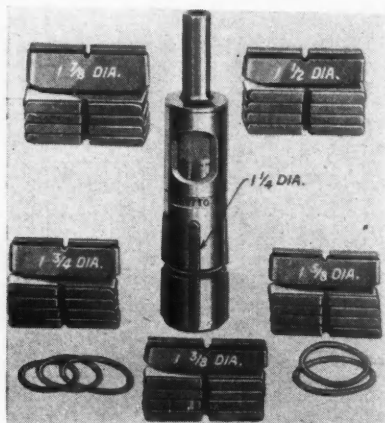
	Acme	American La France	Asterbury	Autocar	Brockway-Indiana	Chevrolet	Diamond T	Dodge Bros.	Fargo	Federal	Ford	G. M. C.	Godfredson	International	Larrabee	Mack	Moreland	Pierce-Arrow	Relay	Reo	Republic	Rugby	Schacht	Selden	Sterling	Stewart	Studebaker	Whippet	White	Willys-Knight	Total Sales by States Including Miscellaneous	
NEB.....Aug.					2	372		28	7	1	385	24		103		1			1	13		4					4	24	3	2	981	
8 mo.					16	2,396	13	242	19	5	2,293	191	1	628		19			1	77	1	15					23	75	29	4	6,091	
NEV.....Aug.						18		10			62	5		5		2	2			1							1		1		113	
8 mo.						146		110	7	1	350	20		23		5	14			7	1	2			1	3			7	1	717	
N. H.....Aug.				2	2	52		11		3	84	6				1				6					1						172	
8 mo.				5	28	592	5	115	9	11	834	55		47		17		1		67		4			3	13	6	16	6	3	1,845	
N. J.....Aug.	4	7		25	30	426	18	112	18	13	692	57		39	3	41		1	4	42		1		4	18	9	11	13	43	5	1,695	
8 mo.	10	35		183	189	3,411	72	718	118	126	5,042	437	13	324	10	471		60	19	438	11	30	15	17	79	54	88	116	245	36	12,856	
N. M.....Aug.						117		9	2		111	7		13														8	4		272	
8 mo.						598		85	17	3	537	37		99						16							2	31	20		1,453	
N. Y.....Aug.	3	4	7	45	158	879	115	219	64	21	1,632	137		210	27	160		6	7	128	4	3	5	16	26	80	8	47	86	3	4,161	
8 mo.	35	152	88	436	1,288	8,418	508	2,295	434	209	12,770	1,048	2	1,568	163	1,255		175	79	1,100	15	60	23	124	145	584	112	312	639	32	34,690	
N. C.....Aug.					1	312		30	1	1	304	5		22		15				6	1	2						6	4		712	
Sept.						395		40	8	1	476	17		42		7				3	3	2						13	9	1	1,039	
8 mo.	17			15	14	2,819		368	15	11	2,786	149		162		57				48	7	13				9	11	34	35	1	6,632	
N. D.....Aug.						142	1	8	3		182	11		77						2							3	8		1	438	
8 mo.						856	6	88	9	4	978	80		635					2	2	37						5	26	4	8	2,767	
OHIO.....Aug.	5			25	27	667	7	102	21	11	1,102	79	1	139	1	29		5	57	1	6	13	4		1	6	2	66	66	15	2,498	
Sept.	1				31	719	4	121	19	7	901	53		108		25		4	57	1	9	11			1	9	3	61	41	6	2,242	
8 mo.	47			150	183	5,409	92	938	118	113	7,769	542	8	1,104	1	199		31	30	521	19	27	94	11	21	46	50	374	416	63	18,612	
OKLA.....Aug.				2	2	520	5	69	12	11	519	31		126		12				21	1	1	3				1	7	26	7	1,390	
8 mo.				7	50	3,356	26	508	55	64	3,809	181		807		49		1	2	140	3	4		21		11	29	136	65	7	9,367	
ORE.....Aug.						186		29	3	8	274	12		20		16	2			20	3	8			6			5	15		615	
8 mo.				1		1,220	1	230	25	54	2,012	159		202		64	24			128	8	36			16		15	21	84		4,359	
PA.....Aug.	10			65	44	897	36	233	43	22	1,617	91	1	194	6	104		4	22	125	2	11	1		36	79	11	59	75	3	3,857	
8 mo.	56	18	19	377	324	6,010	186	1,763	240	122	10,137	725	29	1,146	31	605		32	109	862	46	61	1	9	230	289	93	314	446	31	24,661	
R. I.....Aug.				1	2	61		23	4		86	18		3		5				14	4	2	1		1	1	1	2	4		238	
Sept.						71	2	38	2	2	85	22		7		7				21	1	1	1		2	4	1	1	2		277	
8 mo.	1	3		41	9	514	4	210	26	34	625	129		52		64		4		170	12	8	1	16	25	8	12	26	1	2,010		
S. C.....Aug.						193		7	1	1	220	10		7		1					2							3	2		448	
8 mo.	2				18	1,500		121	19	32	1,485	65		111		13				13	4	3				4	2	13	12		3,425	
S. D.....Aug.					1	317		10	4		218	8		124		1				10		1				1	1	23			719	
8 mo.					2	1,086	8	115	13	2	1,007	62	1	632		9				88		12				2	6	41	5	7	3,106	
TENN.....Aug.	1				16	291	4	20	1	9	291	20		52		10		1		4	2							3	9	15	2	752
8 mo.	1				23	1,896	12	186	4	47	1,543	165		189		47		5		61	5	1					18	22	45	5	4,294	
TEXAS.....Aug.				3	13	1,447		80	18	7	1,446	39		282		8		1	3	67		2				4	3	56	16	1	3,514	
8 mo.				5	54	9,607	31	814	87	38	9,413	457		2,049		78		5	27	351		34				13	41	237	148	11	23,673	
UTAH.....Aug.						68		11	2		155	2		3						5		5							4	3		256
Sept.						98		12	2		214	8		14		1				8		8					2	3	1		372	
8 mo.	1					468		117	7	2	922	24		78		23	3			37		17					8	11	20	1	1,744	
VT.....Aug.					1	56	2	14	2	5	92	8		18		5					7		1				4	1	4		224	
8 mo.					17	398	3	123	22	23	628	52		186	9	34		1	2	76		4				13	8	15	16	5	1,646	
VA.....Aug.				2	4	323	1	15		5	368	10		39	1	5		2	1	12	9	1				4	6	7	12		827	
8 mo.				20	48	2,398	9	245	4	39	2,638	117		291	1	34		3	6	110	30	13				26	15	41	62		6,157	
WASH.....Aug.						252		40	4	2	422	20		51		4				3	20		11			4		1	20	17		902
8 mo.						1,551		349	31	25	2,936	198		314		39	22	3	6	176	9	47			4		21	58	131	2	6,121	
W. VA.....Aug.					9	200	5	25	2	6	232	16		36					2	9	3						2	11	1		560	
8 mo.	5			1	38	1,299	24	238	11	20	1,541	116		291		4				13	106	5	6	1		13	11	26	20	6	3,813	
WIS.....Aug.					1	342	15	52	9	3	503	20		69		3				4	42		1			13	5	5	22	2	1,128	
Sept.						299	14	34	9	5	373	20		60		1			1	3	21		1			2	3	1	28	4	896	
8 mo.	1	1		2	5	3,334	163	450	49	71	5,098	250		733		34	1	8	63	245	4	17			99	56	36	124	54	16	11,087	
WYO.....Aug.						49		14	4		67	3		14		2				5		2						1	1	2		164
8 mo.						237		120	7		459	15		73		4	1			21		5					6	5	11		968	
TOTAL.....Aug.	29	18	7	263	436	16,651	362	2,262	396	235	22,405	1,274	4	3,188	44	646	61	19	72	1,212	52	135	24	31	176	255	116	776	598	65	52,540	
Sales by Makes	275	261	108	1,980	3,271	114,687	2,636	20,459	2,255	2,006	156,149	10,635	147	22,937	270	5,040	542	463	529	9,500	341	854	178	202	1,132							

is compiled by the Robinson's Advertising Service, of Springfield; and New Jersey, which is town and county lists of owners in any section may address any of these three companies.

NEW PRODUCTS FOR THE TRUCK MARKET

Brake Cylinder Grinder

A precision grinder for hydraulic brake cylinders, operable by any $\frac{1}{2}$ -in. electric drill, is offered by the Hutto



Engineering Co., Inc., Detroit, Mich. A micrometer adjustment affords positive setting. Equipment includes six sets of stones and carriers to take care of a range from $1\frac{1}{4}$ to $1\frac{3}{8}$ in. in diameter. The grinder is also suitable for cylinders of many pneumatic tools.

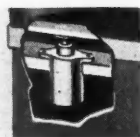
Idlestop Switch

A switch which automatically cuts off the engine ignition when the driver leaves his seat is being offered for installation on trucks with all types of ignition systems by the Nafziger Corp., Kansas City, Mo.

The device is known as the Idlestop and consists of a contact switch located under the driver's seat and an automatic throw-off switch located on the dash. The latter cuts into the wiring system between the ignition switch and coil and is wired to the seat switch, which in turn is grounded. Before the driver can start the engine he must throw on the Idlestop dash switch. As long as the driver is in his seat the dash switch remains on. When he leaves the seat the seat switch breaks contact, causing elements within the dash switch to heat. This draws the tension on a steel finger, which kicks off the dash switch, breaking engine ignition contact even though the regular ignition is left on. Seat switch consists of a plunger spring,



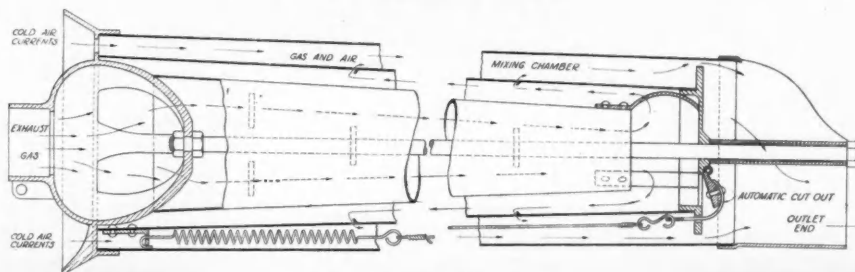
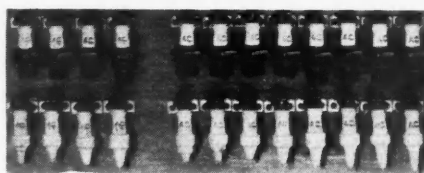
and a housing. It is mounted under the driver's seat in such a manner that the driver's weight will compress the plunger down into the housing. On the



lower end of the plunger is a disk which makes contact at its bottom position with ground wire posts.

AC Spark Plug

The AC Spark Plug Co. has introduced a new line of long life $\frac{7}{8}$ -in. and metric spark plugs for trucks and buses to round out the company's new heat range system. The system includes plugs for standard, hot or cold operation to provide for practically every operating condition encountered by engines. The heat range of a plug is governed by the length of the insulator from its lowest ridge, or step, to the lower end of the center electrode. The illustration shows some of the new line arranged in heat order. The first four are metric, the remainder, $\frac{7}{8}$ -in. size.



Air-cooled Herdle muffler

Truck Tire Valve

A two-piece valve which makes it possible to install any size or shape valve stem on a tube to meet different



truck wheel requirements without changing the valve base is being made by the Dill Manufacturing Co., Cleveland. Known as the Instant-On Valve it consists of a base built in the tube by the maker to which any desired shape valve may be screwed.

Herdle Muffler

An air-cooled muffler, which mixes exhaust gases with air in a jacket surrounding it before ejection, is being produced by the Herdle Muffler Works, 4842-46 Kinzie St., Chicago. It consists of two cylinders and a tapered tube assembled in malleable iron heads by a long center bolt. The cylinders and tube are made of 22 gage steel, lock seamed and riveted. Exhaust gases enter at the inlet head (see sectional view) pass through the tapered tube, strike the rear head and counterflow between the tapered tube and the inner cylinder and then pass through staggered slots in the inner cylinder where the gases are mixed with cold air entering through the front head between the outer and inner cylinders. The mixture finally escapes through the outlet at the rear. The rear head also carries an automatic cut-out, which acts whenever exhaust pressure exceeds the tension of the spring controlling the cut-out valve.

The diagrammatic cutaway view at the left shows the course taken by the exhaust, how it mingles with the air and is expelled.

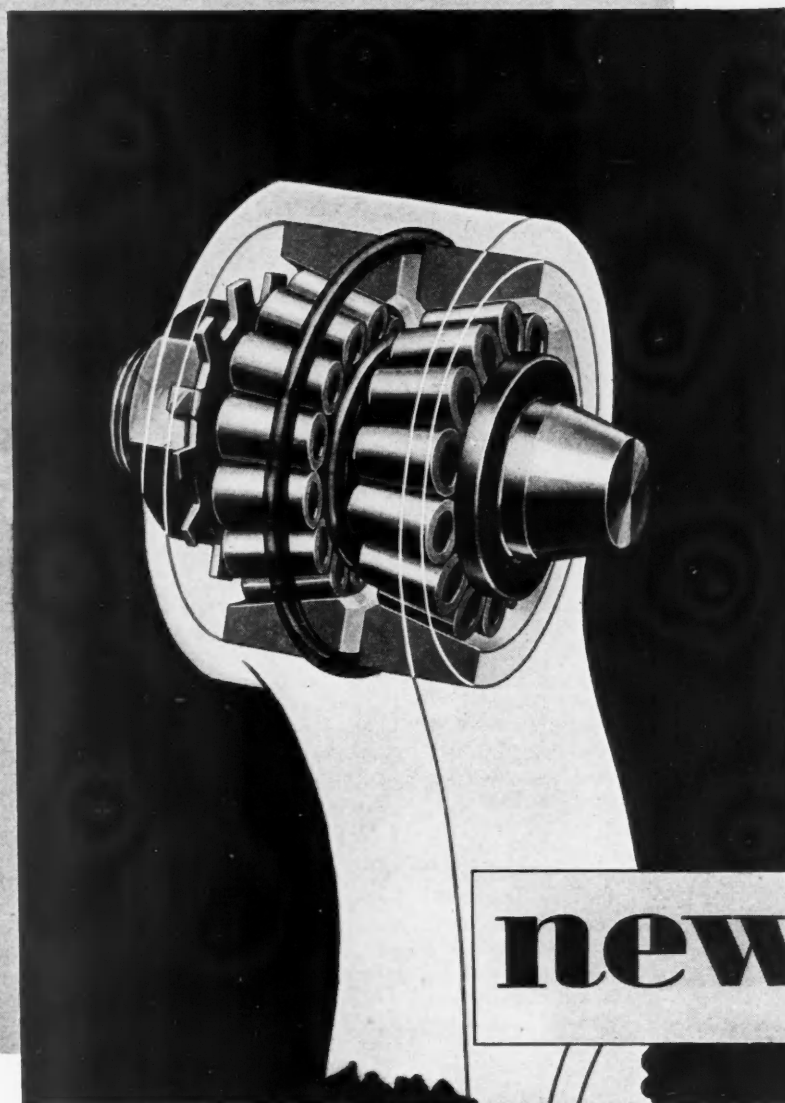
"Roller-Mounted"

**TESTS
PROVE:**

***68% to 79%
Efficiency***



***Over 50%
Increase in
Steering
Ease***



Lever Arm with Detail of New Roller-Mounted Stud

The new Roller-Mounted type of Ross Cam and Lever Steering Gear brings greater efficiency—new steering ease—quick, easy adjustment—plus the many well-known advantages of the exclusive *cam-and-lever* design. Details on request. Please write.

ROSS GEAR AND TOOL COMPANY, LAFAYETTE, INDIANA

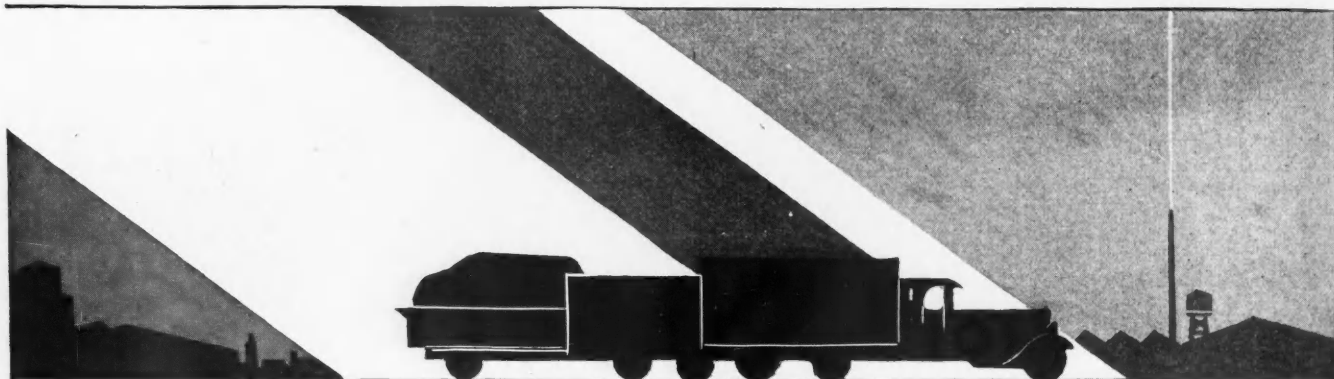
ROSS

**Cam
AND
Lever**

STEERING

"Roller-Mounted"

TRUCK INDUSTRY



N = E = W = S

Harlow H. Curtice Elected President of AC

Harlow H. Curtice was elected president of the AC Spark Plug Co., Flint, Mich., succeeding his former chief, Basil W. de Guichard,



Curtice New
AC President

who resigned on account of ill health. Mr. Curtice joined the company about 16 years ago, and after one year with the concern became comptroller at the age of 21. He became vice-president and assistant general manager in 1927.

Republic Announces Model D-1

Model D-1 is the designation of Republic's newest truck chassis. This unit, rated at 9000 lb. gross weight, is powered by a four-cylinder $3\frac{1}{4} \times 4\frac{1}{2}$ in. Lycoming engine mounted in unit with a Fuller multiple disk clutch and four-speed transmission. The rear is a full-floating Timken bevel. The braking system includes four-wheel hydraulics for service and a transmission mounted drum for parking.

Maccar Adds 2-Ton Model

The Maccar Corp., Scranton, Pa., has announced the addition of a new two-ton, six-cylinder chassis, known as Model 40, to its line. This new model, offered in four wheelbases ranging from 126 to 182 in., is equipped with a six-cylinder, $3\frac{3}{8} \times 4\frac{1}{2}$ in. engine, multiple disk clutch and four-speed transmission mounted in unit. The rear axle is bevel driven and of the full floating type.

Standard gear ratio is 6 $\frac{1}{6}$ to 1. Service brakes are four-wheel Lockheeds and the hand brake is of the disk type mounted on the transmission.

Gramm Forms Holding Company

To provide additional capital for the expansion of Gramm Motors, Inc., a holding company, known as Gramm, Inc., has been organized under the laws of Ohio with 40,000 shares of no par common. The new organization will hold common stock of Gramm Motors, Inc., and the Gramm Finance Co. At the first meeting of the board the following members were chosen as officers: B. A. Gramm, president; W. J. Gramm, vice-president; Joseph Jettinghoff, treasurer, and B. V. Wolfe, secretary.

Weatherproof Doubles Sales

Weatherproof Body Corp., a subsidiary of Allied Motor Industries, Inc., reports sales for the first eight months of the present fiscal year almost double in volume the sales in the corresponding period last year. Business this year amounted to \$1,230,439, compared with \$776,891 last year.

Ford Reduces Prices on Entire Line

The Ford Motor Co. has effected price reductions ranging from \$15 to \$75 on its line of commercial cars. The new prices, however, still are higher than those existing before the last price increases. For example, last January the Model A chassis was increased \$40 from \$325 to \$365, whereas the present reduction is only \$15 from \$365 to \$350. Price of the Model AA truck chassis was originally announced as \$460 and was increased to \$540 about 18 months ago, when big production started, and not last month as erroneously stated in the October issue of COMMERCIAL CAR JOURNAL AND OPERATION & MAINTENANCE. Following is a list of old and new prices with reductions as of Nov. 1.

	New Price	Old Price	Reduction
Model AA truck chassis	\$520	\$540	\$20
Model AA panel delivery	800	850	50
Model A chassis	350	365	15
Model A panel delivery	590	615	25
De Luxe delivery	550	595	45
Pick-up open cab	430	445	15
Pick-up closed cab	460	475	15
Taxicab	725	800	75
Station wagon	650	695	45

Coming Events

SHOWS

Atlantic City—American Bottlers of Carbonated Beverages Nov. 11-15
 Atlantic City—American Road Builders Assn. Jan. 11-18
 Chicago—Motor & Equipment Assn. Nov. 4-9
 Detroit—National Standard Parts Assn. Nov. 11-16
 Chicago—National Automobile Show, Jan. 25-Feb. 1
 New York—National Automobile Show, Jan. 4-11

CONVENTIONS

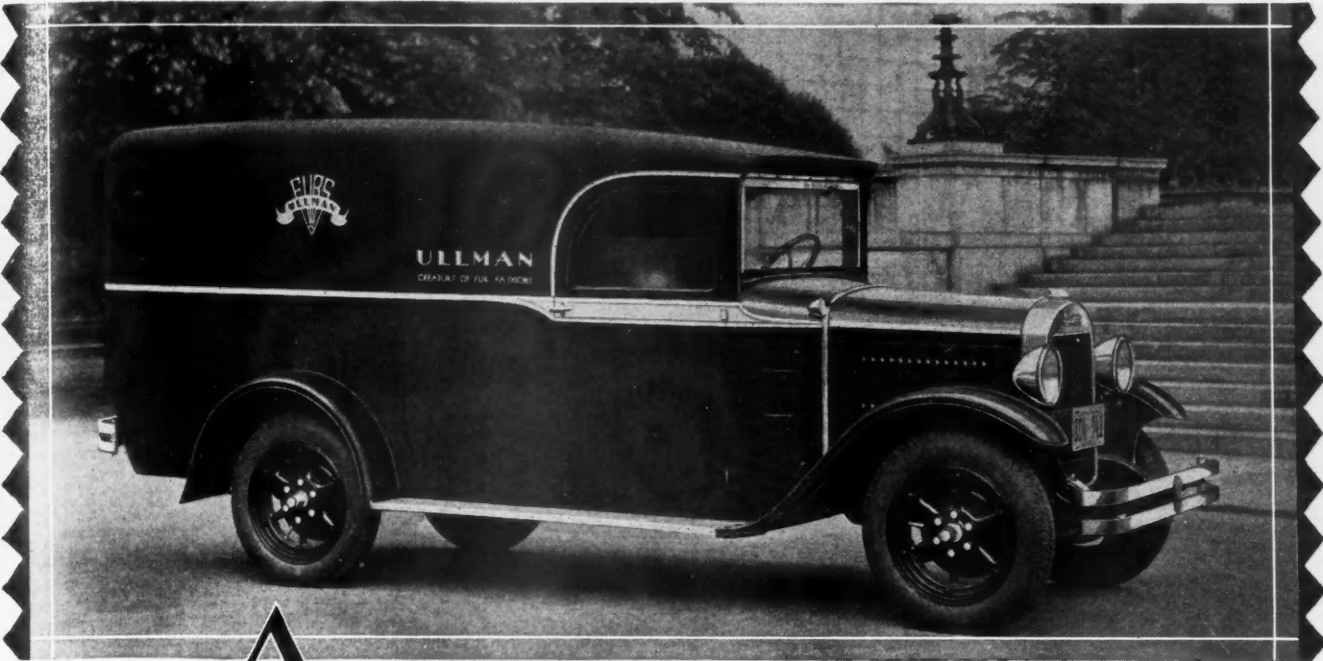
Chicago—National Automobile Dealers Assn. Jan. 27-28
 Detroit—National Standard Parts Assn. Nov. 11-16

R. W. Woodruff White President

Robert W. Woodruff, new president of the White Motor Car Co., is also president of the Coca Cola Co. As head of two \$50,000,000 concerns at the age of 40, his position in the business world is almost unique.



Woodruff
Heads White



ANNOUNCING

A New Custom DeLuxe Panel Body Smart in Appearance

RICH in quiet elegance, revolutionary in design, Stewart's new custom DeLuxe Panel Body adds an air of smart distinction to the modern motor delivery.

Constructed of hard oak and ash, metal covered throughout with sealed and lighted interior, this stylish body is precision built by Stewart master craftsmen. To exclusive shops and department stores desiring a smart ap-

pearing motor delivery for distinctive advertising value, the new Stewart DeLuxe Body is highly recommended.

Standard equipment includes saddle lamps, dome lights, rear view mirror and windshield wiper.

The Body has a 7 foot loading space for the $\frac{3}{4}$ ton model, 8 foot for the 1 ton and 9 foot for the $1\frac{1}{4}$ ton model.

STEWART MOTOR CORPORATION
BUFFALO, N. Y.

Export Branch: 1 BROADWAY (Dept. 3) NEW YORK CITY, U. S. A.
Cables: Stewartruk New York. Codes: Acme, Bentley, ABC 5th Improved 5 & 10 Letter
Universal Trade Code

MODELS

- $\frac{3}{4}$ Ton
6 Cylinder, \$895 Chassis
- 1 Ton**
6 Cylinder, \$995 Chassis
- $1\frac{1}{4}$ Ton
6 Cylinder, \$1295 Chassis
- $1\frac{1}{2}$ Ton
6 Cylinder, \$1495 Chassis
- 2 Ton**
6 Cylinder, \$1695 Chassis
- 2 Ton Special**
6 Cylinder, \$2290 Chassis
- $2\frac{1}{2}$ Ton
6 Cylinder, \$2690 Chassis
- $3\frac{1}{2}$ Ton
6 Cylinder, \$3690 Chassis
- 4 Ton**
6 Cylinder, \$4200 Chassis
- 5 to 7 Ton**
6 Cylinder, \$5700 Chassis

All prices f. o. b. Buffalo

Stewart

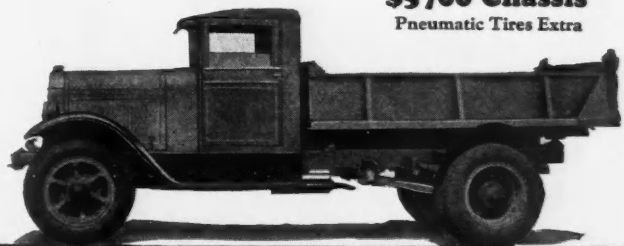
MOTOR TRUCKS

A New 5-7 Tonner

6 cylinder motor, booster 4 wheel brakes, helper springs, large Timken full floating rear axle, cam and lever steering. Transmission gives "low low" of 93.8:1 for pit work.

Wheelbase 165 in. or 150 in. optional standard. Special 175, 190, 220 and 235 in. The greatest heavy duty truck value on the market.

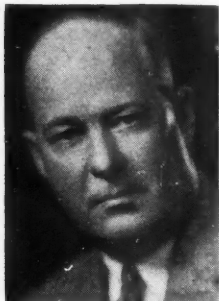
5 to 7 Ton
\$5700 Chassis
Pneumatic Tires Extra



Stewart Trucks Have Won By Costing Less to Run

Schumann Elected G.M.A.C. President

John J. Schumann, Jr., is the newly elected head of General Motors Acceptance Corp. and chairman of the General Exchange Insurance Corp. Mr. Schumann, who has been identified with the management of these organizations as vice-president since their inception, succeeds C. C. Cooper, who has resigned to devote his time to other activities. At a meeting of the Board of Directors of the G.M.A.C., Ira G. McCreery, vice-president of G.M.A.C. and Livingstone L. Short, president of the G.E.I.C., were elected directors.



Robert McTammany

McTammany Sales Manager

Robert McTammany, according to an official statement issued by the B. F. Goodrich Co., has been appointed general sales manager of that company. He succeeds L. A. McQueen, resigned.

Rugby De Luxe Panel Bodies

Two new De Luxe bodies have been added to the Rugby truck series by Durant Motors, Inc. They are priced at \$775 on the half ton and at \$1,160 on the one ton. Interior finish is in plywood paneling, screwed on rather than tacked.

Hecker Now Heads Curtis

Walter C. Hecker, formerly senior vice-president, Curtis Pneumatic Machinery Co., St. Louis, Mo., has been elected president, succeeding E. H. Steedman, who has retired as president but continues on the board of directors. Mr. Hecker became associated with the company in 1905 as sales manager.

Wichita Models

Four new models ranging from 1½ to 3½ tons have been added to the line of the Wichita Falls Motor Co. All except the 1½-ton model are powered by six-cylinder Waukesha engines.

Oshkosh Has New Truck

The Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis., has announced a new truck, Model HXC, rated at four tons and listing at \$5,075. It is equipped with a Hercules six-cylinder engine and Brown-Lipe seven-speed amidship transmission.

Kenworth Makes Model Changes

The Kenworth Motor Truck Corp., Seattle, Wash., announces several replacements and additions to its present truck line. Model VS is a new one-ton chassis which does not replace a former model, while Models 100, 125 and 145 replace the former models, namely Model 45 in the 1½-ton class, Model 55 in the two-ton class, and Model MH in the 2½-ton size. Former Models G and

J also are replaced by Models 184 and 185, both rated at three tons. Model 345 is a new 10-ton six-wheeler, and Model NT a new 10-ton tractor-truck. With the exception of the VS model, six-cylinder engines, Brown-Lipe clutches and transmissions and full-floating Timken axles are common to the new models. The one-ton model is equipped with a six-cylinder Continental engine and semi-floating bevel Clark rear axle.

Indiana Adds Two Models

Two new models in the 5½-ton and over classification have been added to the Indiana line. Both models are powered by six-cylinder Model 16H Continental engines and equipped with Brown-Lipe seven-speed amidship transmissions. They differ in rear axle construction, Model 290 being equipped with a conventional Timken worm-drive rear, while Model 640 is equipped with a Timken tandem worm-driven rear.

George L. Oberholtzer

George L. Oberholtzer, pioneer in the trucking business, died Oct. 24 at his home in Philadelphia. He was 44 years old. Mr. Oberholtzer, active in trucking interests all his life, was president of the National Team and Motor Truck Owners' Association and the Philadelphia branch of that organization. He is survived by his widow and a brother.



R. C. Freitag

Freitag Sterling Advertising Manager

R. C. Freitag has been appointed general advertising manager of the Sterling Motor Truck Co., Milwaukee, Wis. Mr. Freitag was formerly associated in the same capacity with the Kissel Motor Car Co.

Herreshoff Fargo Chief Engineer

A. G. Herreshoff, formerly in charge of engineering in the Fargo Division of Chrysler Motors, has been appointed director of bus and truck engineering of the Dodge Brothers division as well as the Fargo line. Mr. Herreshoff succeeds H. W. Hayes, resigned.

Spicer Lubricant Seal

The Spicer Mfg. Co. has perfected a lubricant seal for use in its Models 400, 500 and 600 bus and truck universal joints. The new feature does not alter the fundamental design of the joint, which is still interchangeable with the old standard. No serious service problem is presented by the new feature, inasmuch as a new casing can be used for replacement on old joints, and the new yokes are interchangeable in the old joints.

Kooman Elected President of Selden

H. E. Zimmerman has resigned as president of the Selden Truck Corp., and as vice-president and general manager of the Hahn Motor Truck Corp., and Arthur J. Kooman has been elected to fill both vacancies. William G. Hahn continues as president of Selden and chairman of the board of Hahn. L. K. Gordon was elected vice-president in charge of production of the Hahn Motor Truck Corp. Mr. Zimmerman continues on the board of directors of both Selden and Hahn. W. H. Rodgers was elected secretary and assistant treasurer of Hahn and Selden.

Martin Quarter-Ton Truck

James B. Martin, who recently announced the \$200 "Baby-car," has organized a new company, the Martin Motor Truck Corp., to produce a small truck embodying the same principles to sell for about \$450. While complete specifications are not available, it is known that the truck will be powered with a conventional four-cylinder engine, will have a 60-in. wheelbase, a tread 12 in. less than usual, and will weigh 700 lb. It is reported that the truck will be able to do 50 miles per hour and will obtain 45 miles on a gallon of gasoline.

Will Use Diesel in Bus

Public Service Coordinated Transport, New Jersey, motor bus operating company, will shortly place in experimental operation a bus fitted with a Mercedes-Benz Diesel engine. The Public Service experiment is said to be the result of a visit to Germany of two of its officials in 1928, where they saw trucks with Diesel engines in successful operation.

Grass-Premier Line

The Grass-Premier Truck Co., Sauk City, Wis., has announced a new 1930 line. Fifteen models are included in the line, ranging in capacity from 1½ to 10 tons. The various models are powered by four, six and eight-cylinder engines and equipped with transmissions providing four, five and seven speeds. See specifications for details.

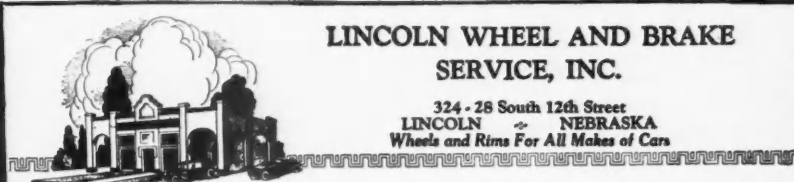
Federal Appoints Mullins



Leo Mullins

Leo Mullins has been appointed sales manager of the national division of the Federal Motor Truck Co., a new post created by the company for the expansion of its sales. Mr. Mullins, identified with the automotive industry for years, until recently was a Reo dealer in Detroit.

**"The Service Manager
is very well pleased . . ."**
for it has given them less trouble than any other kind



**LINCOLN WHEEL AND BRAKE
SERVICE, INC.**

324 - 28 South 12th Street
LINCOLN NEBRASKA
Wheels and Rims For All Makes of Cars

July 8, 1929

Ferodo & Asbestos, Inc.,
New Brunswick, N. J.

Gentlemen:

You will no doubt be glad to have figures on the Ferodo
Brake Lining we have been supplying the Lincoln Traction
Company for their 26 busses.

In checking up mileage today, I find that the first set
of Ferodo we installed has now gone 31,000 miles, and the
lining is not worn out by far as yet. This is 1,000 miles
farther than the original lining with which the bus was
equipped - and 18,000 miles more than any other lining they
have tried.

They have tried several different kinds of moulded shoes,
also all of the woven linings, so I am very proud of Ferodo.

The Service Manager is very well pleased also, for Ferodo
has given them less trouble than any other lining. If you
care to use this letter for advertising purposes, you have
our permission.

Yours very truly,

LINCOLN WHEEL & BRAKE SERVICE, Inc.

By

Geo. S. Benson



18,000 *MORE* miles than any
other brake lining had given them
. . . and Ferodo Bonded Asbestos
Lining is still far from worn out!

Ferodo is regularly making rec-
ords such as this. Test it out on
one of your vehicles . . . then you,
too, will be convinced.

FERODO AND ASBESTOS INCORPORATED

Manufacturers of Ferodo Bonded Asbestos Brake Lining
in rolls and Ferodo pat. Die-Pressed Brake Segments

Factory and General Offices: New Brunswick, New Jersey

E-11-29



AFTER THE SALE

(Continued from page 19)

just exactly what kind of a solution the truck should have for its safety, so it would please us if you would let us supply it." If the special letter does not bring the customer back then a salesman is sent out to determine the trouble and patch up complaints, if any.

Coinciding generally with the letter-personal-call plan, C. E. Anderson, sales manager of the General Motors Truck Co. branch at Birmingham, Ala., said: "After we make a sale we cultivate our customer by keeping in touch with him and telling him of the adjustments that should be made from time to time. Within 30 days after the sale our customers are asked by letter for an opinion on the performance of the truck. Thereafter direct-mail reminders on service are sent at regular intervals and the salesman who sold the truck is required to make regular visits. The sales manager also calls from time to time to talk performance and render assistance whenever possible."

Paul G. Clark, Inc., Chevrolet dealer in Colorado Springs, Colo., gets and holds its customers for service largely through the salesmen. While letters and post cards are mailed at regular intervals these are considered in the light of necessary secondary measures helpful to the contacting salesmen. The letters are friendly and informal in tone, asking how the customer is getting along and inviting him to come to the service department at any time.

Supporting the letter-personal-contact method, H. L. Smoots, sales manager, Federal Truck Co., Birmingham, Ala., declared: "After we have sold a truck we keep in direct contact with the purchaser for several months. We send him direct-mail literature in the interest of our service, call him on the telephone at intervals and contact with him personally from time to time to ascertain how he likes the truck and help him where possible."

By letters from the service department every month, periodical telephone calls from the service manager and personal calls by service department salesmen, F. B. Smith Chevrolet Co., Youngstown, Ohio, keeps the service facilities of its shop in the minds of its truck users. In addition salesmen must see their customers regularly. It is their duty not only to display a polite interest in how the trucks are running, but actually to tackle the hauling problem of the user and seek to work out schedules and methods whereby the equipment will render longer and more complete service.

Customers of the Strausbaugh Motor Co., Dodge Brothers dealer in Youngstown, do not receive many letters and telephone calls, but receive personal calls from truck salesmen who explain the service facilities of the company. "In the cab of every truck sold," W. O.

Strausbaugh, president, explained, "is a little card, which reminds the driver to visit the service department after 200 miles for greasing and tightening, when to come in for crankcase draining, for inspections, and so on. We also offer our customers free inspection service on a quarterly basis. A copy of the inspection report is given to the owner and the duplicate is filed in the office. To impress purchasers of the advantages of having their service work done by us we take them, either before or after the sale, through our \$23,000 stockroom and service department and call their attention to our up-to-date equipment and the efficient way in which work is done."

"To keep the customer sold on his truck and on the service there should be a complete and harmonious tie-up between the sales and service departments," C. C. Morgan, manager of the Buffalo branch of the Mack International Motor Truck Corp., declared in voicing his opinion on after-the-sale relationships. "We try to sell the service department on the idea that repeat business must come because of the good maintenance service it renders to the customers. If our salesmen pick up complaints from their customers, they bring them to our weekly sales meetings where the service department is represented. Here any difficulty that may have developed during the previous week is ironed out. By giving our service manager an opportunity to explain we prevent evil service rumors from being circulated by sympathetic salesmen and promote a friendly spirit between the two departments."

The methods employed by Paul G. Clark, Inc., Colorado Springs, Colo., Chevrolet dealer, measure up very closely to the average, differing only in a few minor aspects. This company's first contact is a letter of thanks posted two days after sale. The next contact, 30 days later, is a personal interview by the salesman, to learn if everything is satisfactory. If he discovers that the customer is disgruntled with the truck, service or firm, the service manager follows up to set things right. The third contact is a folder explaining the company's service and inviting the customer in for inspection. After that the customer's name is placed on the regular mailing list and is campaigned from time to time.

Of the plans which do not emphasize the letter as a means of establishing contacts with customers, that used by J. T. Jenkins, manager of truck department, J. E. French Co., Oakland, Cal., Dodge Brothers dealer, is especially interesting. Mr. Jenkins pointed out that the customer is impressed at the time of the sale of the beginning of a long relationship, and that the company has obligated itself to see to it

that his truck stays on the road. His attention is called to the experienced mechanics employed, time-saving tools and equipment used in the shop, and large inventory of parts carried, as facilities that will save him money in repairs and cut idle truck time. He is also told that an emergency truck is available to him while his own is being repaired. After the customer departs it then devolves upon the salesman to keep him coming back.

T. E. Swain, manager of the Oakland office of the Reo Motor Car Co., while concurring generally with Mr. Jenkins, places particular stress on regular calls by salesmen rather than the initial service story to the customer. He said: "We require each salesman to call once every month and we check him on this to make sure that he does so. If our records reveal that the customer has not been coming in we phone him. By doing this we accomplish two things: first, we check the salesman, and second, if we learn the customer is going elsewhere for service, we catch him before it becomes a habit."

Stating that personal contact is the principal method used to get and hold service business after the sale, R. W. Leach, vice-president of Curtis Auto Co., Reo distributor in Wisconsin, said: "Our salesmen are held responsible for keeping in touch with their customers and seeing to it that service work comes back to the shop."

In the opinion of T. H. Kirksey, truck sales manager, C. H. Wells, Inc., Chevrolet distributor in Seattle, Wash., offering service "specials" once a month is a very effective way of bringing the customer back into the shop. The "specials" consist of special prices on valve grinding, adjusting points, timing valves, etc. Mr. Kirksey pointed out that about 40 per cent of his customers take advantage of these offers and that the increased volume in service sales more than repays the price reduction of the specials.

A. W. Marksheffel, president Marksheffel Motor Co., Dodge Brothers dealer in Colorado Springs, Colo., asserted that the parts department and the quick service furnished by the service department are the factors principally responsible for holding their customers. Customers failing to come in after 90 days are followed up closely by either truck or service salesmen.

"We do not seek service work; most of it comes in automatically," declared S. A. Stephens, president, S. A. Stephens, Inc., Buffalo, Dodge dealer and distributor. "We run our service department to capacity now."

Of all the dealers interviewed only one executive, L. D. Hemmon, G.M.C. distributor in Phoenix, Ariz., stated that no effort was being made to nurse the customer after the sale. Mr. Hemmon claimed that the customer was apt to be annoyed by solicitations and that he would naturally gravitate to the service station when he needed service if the dealer were equipped with up-to-date service facilities and carried a complete inventory of spare parts.

Since the first day of this year . .

35 trucks

have adopted

LOCKHEED HYDRAULIC
Four **BRAKES** *Wheel*

(Figure as of October 15, 1929)

This makes a total of more than 60 adoptions of Lockheed Hydraulics, in the motor truck, bus and delivery fields. These adoptions comprise about 350 separate models.

Perhaps the most significant of these adoptions are those in the bus field. These manufacturers are entirely candid in admitting that for safety and ease of bus operation, Lockheed Hydraulics are virtually a necessity.

As a matter of fact, Lockheed Hydraulics have so conclusively proved their superiority in motor truck service that the present 60 and more adoptions are certain to be substantially increased before the end of the year 1929.

HYDRAULIC BRAKE COMPANY, DETROIT, MICHIGAN, U. S. A.

TRANSPORTATION

(Continued from page 27)

These seven factors are mindful of Kipling's

"I had six honest serving men,
They taught me all I knew,
Their names were 'What' and
'Why' and 'When,'
And 'How' and 'Where' and
'Who.'"

In the case of highway transportation, however, we must add one more servicing man, either "Can" or "May," to represent permission of state laws.

First of all, with these seven factors in mind, is the determination of the type, size, and capacity of the body. This must be based, not alone on the nature of the commodity, but frequently on the purpose for which it is intended as well. This will often be the factor that determines the quantity and the frequency of trips. In many cases some provision must be made for loading or unloading. This may require a pump, hoist, winch, crane, or block traveling on an overhead I-beam mounted over the truck body. These may either be operated by hand or through a power take-off driven by the transmission or otherwise. The various manufacturers of bodies and special equipment will gladly provide specifications and descriptions of their products, and this data should always be on file.

The second step is the determination of the length of the haul and the frequency of the trips. This resolves into the "speed required," and is also an index to the size of the body and as to whether trailers might be used to advantage. In this connection the state laws must be checked for speed, weights, and allowances and overall train lengths permissible if trailers are contemplated.

The third step is the selection of the truck chassis and of the trailers, if they are to be used. Theoretically the loaded body is suspended in the air. We now want a truck chassis (or trailer) of proper capacity, wheelbase and tire equipment to carry away that loaded body. The total load-carrying capacity of the chassis must be sufficiently greater than the combined weight of the body and pay-load, so as to provide a reasonable margin of safety, when operating at its higher speeds and for negotiating rough roads. The wheelbase must be such as to provide proper body and load distribution. If the truck manufacturer's recommendations are followed regarding body lengths with respect to given wheelbases, this means placing approximately 85 per cent of body and payload on the rear axle. With such body and payload distribution the gross weight of the vehicle will be approximately 40 per cent on front and 60 per cent on rear of tires.

Tires must be specified in keeping with capacity ratings set by the tire manufacturers, based on the actual

weights of truck chassis on front and rear wheels at the ground, plus the weight of those given percentages of loaded body weight thrown on front and rear respectively by the load distribution. The rear axle gear ratio must be so specified as to produce the road speed desired and the pulling ability required to handle the load in high gear, with consideration of the type of road and the grades to be encountered.

Possibly a high gear ratio is necessary in order to provide sufficient pulling ability to handle trailers. This ratio might, however, reduce the road speed below what is expected. The only way to circumvent this condition is to use a slightly lower ratio to increase the road speed or in the event none is available, larger diameter tires will obtain the same result.

The old saying, "You can't have your cake and eat it," applies. You can't have both power and speed beyond certain limits. For example, a certain truck model of sufficient capacity to carry a given load is merely capable of moving that load in high gear. The maximum road speed obtainable, based on engine speed, tire size, and gear ratio is 20 m.p.h. Theoretically the road speed can be increased either by changing to a lower gear ratio or by changing to larger diameter tires. But if that is done the truck will not be able to move the load in high gear because it was merely able to do so before the change was made to increase the speed. The only way in which either power or speed can be increased without a sacrifice of one of the two is by replacing the powerplant with one capable of a greater output. Generally this means a different truck model equipped with a more powerful engine. Incidentally, there is a decided trend today toward the use of more powerful engines and faster rear axles to accommodate the demand for speed with large loads. This same demand is also responsible for the growing popularity of transmissions providing more than three speeds, which permit the use of faster axles. Use of such transmissions may and does affect the choice of rear axle ratios.

It is easy to perceive that a 2-ton truck pulling a 5-ton trailer, with a total pay load of seven tons, is a more efficient operation than a 5-ton truck carrying only a 5-ton load. This assumes, of course, that all the factors involved will permit such operation. The combined initial investment for the 2-ton truck and 5-ton trailer is approximately half that for the 5-ton truck alone. The 2-ton truck is undoubtedly faster on the highway, meaning more trips and, of course, more tonnage. The operating cost for the 2-ton truck and trailer will be higher than for a 2-ton truck alone, but will be less than that for the 5-ton truck. There is no ques-

tion that the transportation efficiency of the 2-ton truck and trailer train is much greater than that of the 5-ton truck—but will the operation itself, the commodity hauled, the nature of roads and grades and the state laws permit the use of the truck and trailer train? And if so, can the 2-ton truck handle that additional load on the drawbar in high gear on the highway?

This can only be determined by carefully checking the "tractive effort available" against the "tractive effort required." The first is based on the torque of the engine, the total gear reduction, engine to road wheels and the size of the tires. The "tractive effort required" is based on the total loaded train weight in tons, the road resistance for the type of road to be traveled and the grade resistance.

The road speed must also be checked in order to determine the number of trips that can be made over a given distance, in a given time. This is based on the speed of the engine, the total gear reduction, engine to road wheels, and the wheel diameter.

When pneumatic tires are justified and load distributions will permit, it is highly desirable from the standpoint of interchangeability to equip both truck and trailer with the same size tires all around. This will generally mean singles under the front of the truck and duals under the rear; also duals under the semi-trailer if one is included in the train, and duals both front and rear under the four-wheel trailers. This can be controlled to a great extent by specifying the width and length of bodies in relation to the wheelbase, so as to distribute the load for that purpose. Generally, a combination of pneumatic and solid tires in the same truck and trailer train is a mistake, because the speed of the train is limited by the solid tires in it. Further, the pneumatic tires are hardly justified under the truck as a protecting cushion because the speed will not be great enough. On the other hand, if the truck with its loaded train is capable of pneumatic tire speed (faster than 20 m.p.h.), then pneumatics are justifiable for the trailers as well as for the truck.

A careful study of the routes over which the trucks operate will often disclose ways and means of effecting more speedy delivery at lower unit costs. In many operations a heavy truck and trailer train can leave the central loading station, leaving the loaded trailers at strategic points throughout the city for further delivery direct to the customer, by small delivery trucks. This system is much used by ice cream manufacturers, large bakeries, grocers, department stores, and others.

Regardless of the nature of the business, a careful analysis of the transportation problem must be made before the proper equipment can be determined. And before the truck can be selected, the body must have been specified.

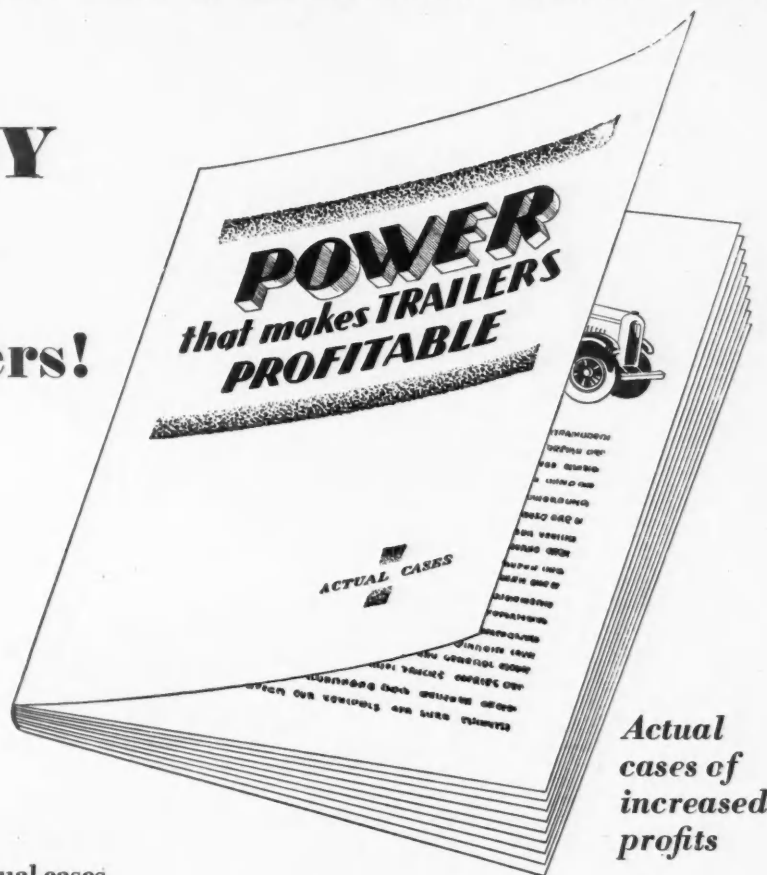
The man who can be of real service to the user of transportation in analyzing his problems—will always be a welcome visitor.

NEWS *with* PROFIT IN IT

furnished BY
Truck Users
FOR Truck Users!



FREE
 (note coupon)



*Actual
 cases of
 increased
 profits*

THIS book records results . . . gives actual cases of increased profits from truck operation by important firms. It shows plainly *how* and *why* they've found that a scientific combination of truck and trailer . . . in certain types of haulage . . . frequently triples the truck's ability to make money for its owner.

These fact-and-figure recitals (with photographic illustrations) have come from responsible organizations in many different lines: the Standard Oil Company of Ohio, for example, the Northwestern Terminal Company, and the Keeshin Motor Express Company of Chicago.

You'll find how other companies have successfully met haulage problems that may parallel your own.

The Way to Bigger Profits!

Clearly, simply, this book shows how you can obtain a truck-trailer combination that is precisely right in every detail: rear axle ratio, pulling power, braking system, tire equipment, weight distribution, and other factors equally important—when and if you introduce trailers into your work.

To save you time and trouble, there's a coupon below that will bring your copy without cost or obligation. The book is large—8½ x 11 inches—hence it is printed in a limited edition. We suggest that you mail the coupon now—to make sure of your copy.

You'll find it worth having, reading . . . immediately!

GENERAL MOTORS TRUCKS

GENERAL MOTORS TRUCK COMPANY, Pontiac, Mich.
 (Subsidiary of Yellow Truck & Coach Mfg. Co.)

GENERAL MOTORS TRUCKS, YELLOW CABS and COACHES.
 Factory Branches, Distributors, Dealers—in 1,500 principal cities and towns. (Time payments financed through Yellow Manufacturing Acceptance Corporation plan, at lowest available rates.)

GENERAL MOTORS TRUCK COMPANY,
 Dept. 106, Pontiac, Mich.

Gentlemen: Please send without cost or obligation booklet containing the actual operating experiences with tractor-trailer combinations of firms in many lines of business.

Name.....

Address.....

DIESEL ENGINES

(Continued from page 25)

an informal investigation, and herewith places before its readers an up-to-date resume of the situation.

Although no company is ready to introduce a Diesel engine at the present time, a majority of them admit that they are experimenting with engines of this type. All engineers who discussed the question agree that there are serious difficulties in the way of developing a Diesel engine which will be a sales advantage to the truck maker incorporating it in his line. A few engineers believe these difficulties to be insurmountable under present conditions. Nevertheless, we hazard the guess that the first company to introduce a Diesel engine will have plenty of competition.

Several engineers and executives seemed quite willing to tell the present status of Diesel engine development and plans for the future—of their competitors. They suggested that we go to see certain officials, or call on other companies to get the latest dope about Diesels. We "learned" from them that this company was doing so-and-so and that company experimenting along such-and-such lines. When we asked what their own plans were, a few told us, after exacting a stern pledge of secrecy. Others remarked that the day was a good one for golf.

Experimenting with Diesels represents nothing new for some of the companies. They are testing constantly a wide variety of ideas for the improvement of engines. As a result of this policy the companies are keeping up-to-date with developments along Diesel lines and will suffer no handicap if conditions call for introduction of a new engine on short notice.

Difficulties standing in the way of production of a Diesel engine for use in trucks in this country were explained clearly by an engineer of a company which has no present intention of marketing a Diesel engine.

"Conditions in the United States are different from those existing in Europe, especially in Germany, where the Diesel engine has been used with success for some years. Fuel is cheap here, abroad it is dear. The difference in price between gasoline and fuel oil suitable for Diesel consumption is comparatively small. Gasoline is available everywhere; fuel oil is not.

"In my opinion, one of the most important handicaps to the development of a Diesel engine in this country is the new cracking process of oil refining which enables refiners to extract approximately 70 per cent of gasoline from crude, compared with only 30 per cent under former methods. Therefore there is comparatively little saving in using fuel oil.

"Another difficulty is the question of weight. Ordinarily a Diesel engine weighs much more than a gasoline en-

gine of the same horsepower. Lower speed of the Diesel is one of the reasons for this difference in weight. Weight of a Diesel engine can be reduced by running at higher speeds, but that brings us face to face with a new set of problems. A Diesel engine requires a pump for forcing fuel into each cylinder at the proper time and in precisely the right amount. On small, high-speed Diesels the pump parts and the cylinder nozzles are very small. Therefore, they are rather delicate and are more easily clogged or put out of action than larger parts.

"Owners and drivers will not put up with operating difficulties for the sake of savings which they consider unimportant. The reverse is true in foreign countries where fuel is much more expensive. Truck owners in Germany, for illustration, put up with minor operating difficulties which our owners would not tolerate.

"Because it is difficult to design and build a reliable high-speed Diesel engine, it has been suggested that we sacrifice something in weight for the economy of the Diesel and its very desirable characteristic of pulling well at slow speed. But in following this course we step from one problem to another. It costs money to carry the extra weight of the engine. If the speed is slow, this cost is low, but it mounts rapidly as speed increases. It takes a lot of fuel saving to overcome the disadvantage of carrying several hundred pounds of extra engine at a speed of 30 m.p.h. or better. Or, expressed in another way, the saving in fuel to justify a Diesel engine must be more than the operator will receive in revenue for hauling an amount of freight which equals the difference in weight."

Several trucks which were recently announced combine large carrying with high speed. To accomplish this standard of performance the manufacturers have incorporated powerful gasoline engines, developing 100 hp. or even more. This is the field in which we may expect the first appearance of the truck Diesel, in the opinion of several engineers. The engineering problems involving in design a Diesel of 100 or 150 hp. are very much simpler than those entailed in building a 50-hp. unit.

Fuel cost is but a fraction of the total cost of operating a truck, as more than one engineer pointed out, and there is ample evidence that owners are quite willing to spend more money for fuel if they accomplish more by so doing. Obviously, it costs more to transport a load of five tons at 30 m.p.h. than it does at 10 m.p.h. But everyone knows that operators willingly sacrifice the economy of 10 m.p.h. travel for the advantages of passenger-car speeds on the road. Because of these facts there is doubt in the minds of a few engi-

neers whether operators would be interested in Diesels unless fuel saving could be gained without extra cost, additional weight or complicated construction.

Developing a satisfactory truck Diesel engine is no small undertaking to be entered upon lightly, as one engineer aptly expressed it, without intending a pun. He said that any company undertaking it must be prepared to spend money running probably into six figures. There are so many other problems engrossing the attention of engine and truck designers that he doubted the wisdom trying it at the present time.

While these expressions might give the impression that the future of the Diesel is far from bright, the fact is that engineers are not pessimistic, but they do fully realize the proportions of the job. This job is no more difficult than the job that would have confronted engineers if 10 years ago they had been asked to design an engine embodying the performance and longevity of a modern engine. It would have been done if necessary.

A sure indication that the Diesel engine is a live topic is the careful watch certain companies are keeping on any developments in this field. Fuel oil burning experiments by Phila. Rapid Transit Co. on gas-electric buses in Philadelphia attracted a most unusual amount of attention. True, this was not a Diesel development, but a means of vaporizing fuel oil for combustion in a standard engine, but this feature did not alter the fact that it was a fuel oil burning experiment. Any one who takes the trouble to make enough discreet inquiries will learn that another large fleet operator is running a vehicle equipped with a Diesel engine. Still another operator has offered his facilities to an engine builder for a co-operative test of Diesels in actual service. Several truck companies have tested their own Diesel engines as well as those of engine builders.

While no executives or engineers have gone so far as to don false whiskers and snoop around a competitor's experimental department disguised as an insurance inspector in order to find out what is going on, they are "keeping an ear to the ground."

The Diesel engine situation is like a tight baseball game which has gone to extra innings. The game may continue until called by darkness or some break may bring it to an end at any time. Consensus of opinion of truck and engine makers interviewed on this subject is that a truck Diesel engine will not be introduced for some time to come. But there is always a chance of a "break." If the price of gasoline were to jump overnight to 50 cents per gallon, there would be Diesels on the market in a few weeks. Again, some organization taking up Diesel engine development might solve the engineering problems and hop into production. In which case several other announcements could be expected, according to several of those who are in a position to know.

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

Those Chassis Which Are Sold and Recommended for Bus Use Are Designated in the Following Table by Reference Sign (\$) in Front of the Name

(Where prices are not given it is because we have been unable to get them from authoritative sources)

* Changes

† New Models

Key of abbreviations page 78

Trade Name and Model	General			Engine					Electrical System		Clutch	Gearset		Rear Axle		Gear Ratios		Front Axle Make and Model	Steering Gear (Make)	Standard Wheelbase		Chassis Weight (lbs.)								
	Chassis Price	Tire Size		Make and Model	Number of Cylinders	N.A.C.C. Rated H.P.	Valve Arrangement	Oiling System	Governor (Make)	Radiator (Make)		Fuel System		Ignition System	(Make) Generator and Starter	Type and Make	Make and Model			Location	No. of Forward Speeds		Universal (Make)	Rear Axle		Total Reduction in High	Total Reduction in Low	Brakes, Location	Cab to rear of frame	Cab to rear axle
		Standard Wheelbase (inches)	Maximum Wheelbase (inches)									Front (inches)	Rear (inches)											Carburetor (Make)	Fuel Feed					
1000 Pounds																														
Chevrolet Int. Com.	400	107	107	B 4 50/20 B 4 50x20	Own	6-34x44	26.3 H	PC	PG	Non	McC	Car	V	D-R	D-R	P. Own	Own Int.	U	3	Own	Own Int.	5	3.82	12.68 E*	Own Int.	Own	26%	1815		
Dodge Brothers	525	109	109	B 4 75/28 B 4 75x28	Own	4-36x44	21.0 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.7	14.28 G	Own	66%	1900			
Dodge Brothers	495	107	107	B 4 75/28 B 4 75x28	Own	4-36x44	18.2 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.7	14.28 E*	Own	66%	1650			
Dodge Brothers	585	107	107	B 5 00/19 B 5 00x19	Own	6-34x44	26.3 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.7	14.28 E*	Own	66%	1935			
Fargo Truck	625	109	109	B 5 00/19 B 5 00x19	Own	6-34x44	26.3 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.7	14.67 G	Pontiac	Jac	50%	1885		
Gen. Mot. T11-1001	805	115	115	B 5 25/28 B 5 25x28	Con 10E	4-36x44	18.0 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.55	14.67 G	Roe	Roe	22%	2290		
Reo Special Wagon Jr.	805	103	103	B 4 75/28 B 4 75x28	Own	4-34x44	26.3 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.55	14.7 H*	Own	Own	26	1691		
1500 Pounds																														
Dodge Brothers	675	124	124	B 5 50/20 B 5 50x20	Own	4-36x44	21.0 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	5.63	21.16 G	Own	66%	31	2260		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-36x44	21.0 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	5.63	21.16 G	Own	66%	31	2380		
Dodge Brothers	825	124	124	B 5 50/20 B 5 50x20	Own	6-34x44	27.3 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	5.11	19.21 G	Own	66%	31	2480		
Dodge Brothers	775	124	124	B 5 50/20 B 5 50x20	Own	6-34x44	26.3 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	5.6	18.16 K	Own	66%	31	2560		
Dodge Brothers	505	110	110	B 5 50/20 B 5 50x20	Own	6-34x44	26.3 L	SP	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	5.6	18.16 K	Own	66%	25%	1965		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	23.4 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%	50%	2300		
Dodge Brothers	725	124	124	B 5 50/20 B 5 50x20	Own	4-31x44	19.6 L	PC	PC	Non	McC	Car	V	D-R	D-R	P. Own	Own	U	3	Own	Own	5	4.45	15.1 H*	Own	66%				

Trade Name and Model	General			Engine							Electrical System		Clutch	Gearset		Rear Axle		Gear Ratios		Front Axle Make and Model	Steering Gear (Make)	Standard Wheelbase		Chassis Weight (lbs.)		
	Standard Wheelbase (inches)	Maximum Wheelbase (inches)	Tire Size	Rear (inches)	Make and Model	Number of Cylinders	N.A.C.C. Rated H.P.	Valve Arrangement	Oiling System	Governor (Make)	Radiator (Make)	Fuel System		Type and Make	Make and Model	Location	No. of Forward Speeds	Universals (Make)	Make and Model			Type	Total Reduction in High		Total Reduction in Low	Brakes, Location	Cab to rear of frame	Cab to rear axle
												Carburetor (Make)	Fuel Feed							Ignition System (Make)	Generator and Starter (Make)					
	1 Ton—Cont'd																									
Kleiber 20	1450	140	P 30x5	P 30x5	Con 16C	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	100	64	3000				
Larnabee 20	143	160	P 32x6	P 32x6	Wau V	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Le Moon HB10	1500	130	P 30x5	P 30x5	Con 16C	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Luedinghaus	130	172	P 30x5	P 30x5	Bud H56	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Relay 20B	1700	142	P 30x5	P 30x5	Con 16E	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Reo DA	995	127	P 30x5	P 30x5	Con 16E	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Reo DC	1075	138	P 30x5	P 30x5	Con 16E	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Rugby Exp.	975	128	P 30x5	P 30x5	Con 31L	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Selden 7	975	128	P 30x5	P 30x5	Con 29L	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Stewart 20Y	124	124	P 30x5	P 30x5	Bud H56	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Stewart Buddy	1000	142	P 30x5	P 30x5	Con 16E	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Studebaker GN-N	995	128	P 30x5	P 30x5	Con 16E	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Studebaker GN-S	1065	146	P 30x5	P 30x5	Con 16E	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
United 16	1045	130	P 32x4 1/2	P 32x4 1/2	Wau X	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
United 16C	1222 1/2	122 1/2	P 32x4 1/2	P 32x4 1/2	Bud WTU	6-33x44	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
U. S. U.	1850	138	P 34x5	P 34x5	Con 8R	4-33x45 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Wachsmuth S.	152	152	P 30x5	P 30x5	Con 8R	4-33x45 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
White 15B	1545	133 1/2	P 30x5	P 30x5	Con 2A	6-33x44 1/2	29.4	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
White 60	1850	138 1/2	P 30x5	P 30x5	Con 2A	6-33x44 1/2	29.4	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
World D-60	143	151	P 32x6	P 32x6	Lyc 4SL	6-33x44 1/2	25.3	L	PC	Non	Mod	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
1 1/4 Ton																										
Biederman	154	154	P 32x6	P 32x6	Con 8R	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Brookway Junior	137	130	P 30x5	P 30x5	Wis C	4-33x45	22.5	L	PC	Non	G&O	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Brookway 75	1370	137	P 32x6	P 32x6	Con 16C	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Clinton 20B	150	150	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Clyde 10A	154	154	P 30x5	P 30x5	Con S4	4-41x44 1/2	28.9	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Corbett 620	137	150	P 32x6	P 32x6	Con 18E	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Day-Elder MF	1345	131	P 30x5	P 30x5	Con 16C	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Deage RU-45	145	168	P 32x6	P 32x6	Wau XA	6-33x44 1/2	25.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Federal 100	1300	156	P 32x6	P 32x6	Con 16C	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Gen. Mot. T19-2001	1015	127 1/2	P 34x7	P 34x7	Pontiac	6-33x44 1/2	26.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Gen. Mot. T19-2002	975	127 1/2	P 34x7	P 34x7	Pontiac	6-33x44 1/2	26.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-24	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2	27.3	L	PC	Non	Own	Str	G	D-R	D-R	D-R	Col	Tim 12307	Ros	96	54	3745				
Goffredon RB-26	131	160	P 30x5	P 30x5	Bud WTU	6-33x44 1/2																				

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*The Commercial Car Journal
and Operation & Maintenance*

Trade Name and Model	General			Engine				Electrical System		Clutch	Gearset		Rear Axle		Gear Ratios		Front Axle Make and Model	Steering Gear (Make)	Standard Wheelbase																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
	Chassis Price	Maximum Wheelbase (Inches)	Tire Size	Make and Model	Number of Cylinders	N.A.C.C. Rated H.P.	Valve Arrangement	Oiling System	Governor (Make)		Radiator (Make)	Fuel System		Ignition System	Generator and Starter (Make)	Type and Make			Location	No. of Forward Speeds	Universals (Make)	Make and Model	Final Drive	Total Reduction in High	Total Reduction in Low	Brakes, Location	Front Axle Make and Model	Steering Gear (Make)	Standard Wheelbase																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
												Carburetor	Fuel Feed																Cab to rear axle	Cab to rear of frame																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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*The Commercial Car Journal
and Operation & Maintenance*

Model	Year	Price	Engine	Transmission	Drivetrain	Options	Notes
Model A	1920	1200	1000	4	2	...	...
Model B	1921	1300	1100	4	2	...	...
Model C	1922	1400	1200	4	2	...	...
Model D	1923	1500	1300	4	2	...	...
Model E	1924	1600	1400	4	2	...	...
Model F	1925	1700	1500	4	2	...	...
Model G	1926	1800	1600	4	2	...	...
Model H	1927	1900	1700	4	2	...	...
Model I	1928	2000	1800	4	2	...	...
Model J	1929	2100	1900	4	2	...	...
Model K	1930	2200	2000	4	2	...	...
Model L	1931	2300	2100	4	2	...	...
Model M	1932	2400	2200	4	2	...	...
Model N	1933	2500	2300	4	2	...	...
Model O	1934	2600	2400	4	2	...	...
Model P	1935	2700	2500	4	2	...	...
Model Q	1936	2800	2600	4	2	...	...
Model R	1937	2900	2700	4	2	...	...
Model S	1938	3000	2800	4	2	...	...
Model T	1939	3100	2900	4	2	...	...
Model U	1940	3200	3000	4	2	...	...
Model V	1941	3300	3100	4	2	...	...
Model W	1942	3400	3200	4	2	...	...
Model X	1943	3500	3300	4	2	...	...
Model Y	1944	3600	3400	4	2	...	...
Model Z	1945	3700	3500	4	2	...	...
Model AA	1946	3800	3600	4	2	...	...
Model AB	1947	3900	3700	4	2	...	...
Model AC	1948	4000	3800	4	2	...	...
Model AD	1949	4100	3900	4	2	...	...
Model AE	1950	4200	4000	4	2	...	...
Model AF	1951	4300	4100	4	2	...	...
Model AG	1952	4400	4200	4	2	...	...
Model AH	1953	4500	4300	4	2	...	...
Model AI	1954	4600	4400	4	2	...	...
Model AJ	1955	4700	4500	4	2	...	...
Model AK	1956	4800	4600	4	2	...	...
Model AL	1957	4900	4700	4	2	...	...
Model AM	1958	5000	4800	4	2	...	...
Model AN	1959	5100	4900	4	2	...	...
Model AO	1960	5200	5000	4	2	...	...
Model AP	1961	5300	5100	4	2	...	...
Model AQ	1962	5400	5200	4	2	...	...
Model AR	1963	5500	5300	4	2	...	...
Model AS	1964	5600	5400	4	2	...	...
Model AT	1965	5700	5500	4	2	...	...
Model AU	1966	5800	5600	4	2	...	...
Model AV	1967	5900	5700	4	2	...	...
Model AW	1968	6000	5800	4	2	...	...
Model AX	1969	6100	5900	4	2	...	...
Model AY	1970	6200	6000	4	2	...	...
Model AZ	1971	6300	6100	4	2	...	...
Model BA	1972	6400	6200	4	2	...	...
Model BB	1973	6500	6300	4	2	...	...
Model BC	1974	6600	6400	4	2	...	...
Model BD	1975	6700	6500	4	2	...	...
Model BE	1976	6800	6600	4	2	...	...
Model BF	1977	6900	6700	4	2	...	...
Model BG	1978	7000	6800	4	2	...	...
Model BH	1979	7100	6900	4	2	...	...
Model BI	1980	7200	7000	4	2	...	...
Model BJ	1981	7300	7100	4	2	...	...
Model BK	1982	7400	7200	4	2	...	...
Model BL	1983	7500	7300	4	2	...	...
Model BM	1984	7600	7400	4	2	...	...
Model BN	1985	7700	7500	4	2	...	...
Model BO	1986	7800	7600	4	2	...	...
Model BP	1987	7900	7700	4	2	...	...
Model BQ	1988	8000	7800	4	2	...	...
Model BR	1989	8100	7900	4	2	...	...
Model BS	1990	8200	8000	4	2	...	...
Model BT	1991	8300	8100	4	2	...	...
Model BU	1992	8400	8200	4	2	...	...
Model BV	1993	8500	8300	4	2	...	...
Model BW	1994	8600	8400	4	2	...	...
Model BX	1995	8700	8500	4	2	...	...
Model BY	1996	8800	8600	4	2	...	...
Model BZ	1997	8900	8700	4	2	...	...
Model CA	1998	9000	8800	4	2	...	...
Model CB	1999	9100	8900	4	2	...	...
Model CC	2000	9200	9000	4	2	...	...
Model CD	2001	9300	9100	4	2	...	...
Model CE	2002	9400	9200	4	2	...	...
Model CF	2003	9500	9300	4	2	...	...
Model CG	2004	9600	9400	4	2	...	...
Model CH	2005	9700	9500	4	2	...	...
Model CI	2006	9800	9600	4	2	...	...
Model CJ	2007	9900	9700	4	2	...	...
Model CK	2008	10000	9800	4	2	...	...
Model CL	2009	10100	9900	4	2	...	...
Model CM	2010	10200	10000	4	2	...	...
Model CN	2011	10300	10100	4	2	...	...
Model CO	2012	10400	10200	4	2	...	...
Model CP	2013	10500	10300	4	2	...	...
Model CQ	2014	10600	10400	4	2	...	...
Model CR	2015	10700	10500	4	2	...	...
Model CS	2016	10800	10600	4	2	...	...
Model CT	2017	10900	10700	4	2	...	...
Model CU	2018	11000	10800	4	2	...	...
Model CV	2019	11100	10900	4	2	...	...
Model CW	2020	11200	11000	4	2	...	...
Model CX	2021	11300	11100	4	2	...	...
Model CY	2022	11400	11200	4	2	...	...
Model CZ	2023	11500	11300	4	2	...	...
Model DA	2024	11600	11400	4	2	...	...
Model DB	2025	11700	11500	4	2	...	...
Model DC	2026	11800	11600	4	2	...	...
Model DD	2027	11900	11700	4	2	...	...
Model DE	2028	12000	11800	4	2	...	...
Model DF	2029	12100	11900	4	2	...	...
Model DG	2030	12200	12000	4	2	...	...
Model DH	2031	12300	12100	4	2	...	...
Model DI	2032	12400	12200	4	2	...	...
Model DJ	2033	12500	12300	4	2	...	...
Model DK	2034	12600	12400	4	2	...	...
Model DL	2035	12700	12500	4	2	...	...
Model DM	2036	12800	12600	4	2	...	...
Model DN	2037	12900	12700	4	2	...	...
Model DO	2038	13000	12800	4	2	...	...
Model DP	2039	13100	12900	4	2	...	...
Model DQ	2040	13200	13000	4	2	...	...
Model DR	2041	13300	13100	4	2	...	...
Model DS	2042	13400	13200	4	2	...	...
Model DT	2043	13500	13300	4	2	...	...
Model DU	2044	13600	13400	4	2	...	...
Model DV	2045	13700	13500	4	2	...	...
Model DW	2046	13800	13600	4	2	...	...
Model DX	2047	13900	13700	4	2	...	...
Model DY	2048	14000	13800	4	2	...	...
Model DZ	2049	14100	13900	4	2	...	...
Model EA	2050	14200	14000	4	2	...	...
Model EB	2051	14300	14100	4	2	...	...
Model EC	2052	14400	14200	4	2	...	...
Model ED	2053	14500	14300	4	2	...	...
Model EE	2054	14600	14400	4	2	...	...
Model EF	2055	14700	14500	4	2	...	...
Model EG	2056	14800	14600	4	2	...	...
Model EH	2057	14900	14700	4	2	...	...
Model EI	2058	15000	14800	4	2	...	...
Model EJ	2059	15100	14900	4	2	...	...
Model EK	2060	15200	15000	4	2	...	...
Model EL	2061	15300	15100	4	2	...	...
Model EM	2062	15400	15200	4	2	...	...
Model EN	2063	15500	15300	4	2	...	...
Model EO	2064	15600	15400	4	2	...	...
Model EP	2065	15700	15500	4	2	...	...
Model EQ	2066	15800	15600	4	2	...	...
Model ER	2067	15900	15700	4	2	...	...
Model ES	2068	16000	15800	4	2	...	...
Model ET	2069	16100	15900	4	2	...	...
Model EU	2070	16200	16000	4	2	...	...
Model EV	2071	16300	16100	4	2	...	...
Model EW	2072	16400	16200	4	2	...	...
Model EX	2073	16500	16300	4	2	...	...
Model EY	2074	16600	16400	4	2	...	...
Model EZ	2075	16700	16500	4	2	...	...
Model FA	2076	16800	16600	4	2	...	...
Model FB	2077	16900	16700	4	2	...	...
Model FC	2078	17000	16800	4	2	...	...
Model FD	2079	17100	16900	4	2	...	...
Model FE	2080	17200	17000	4	2	...	...
Model FF	2081	17300	17100	4	2	...	...
Model FG	2082	17400	17200	4	2	...	...
Model FH	2083	17500	17300	4	2	...	...
Model FI	2084	17600	17400	4	2	...	...
Model FJ	2085	17700	17500	4	2	...	...
Model FK	2086	17800	17600	4	2	...	...
Model FL	2087	17900	17700	4	2	...	...
Model FM	2088	18000	17800	4	2	...	...
Model FN	2089	18100	17900	4	2	...	...
Model FO	2090	18200	18000	4	2	...	...
Model FP	2091	18300	18100	4	2	...	...
Model FQ	2092	18400	18200	4	2	...	...
Model FR	2093	18500	18300	4	2	...	...
Model FS	2094	18600	18400	4	2	...	...
Model FT	2095	18700	18500	4	2	...	...
Model FU	2096	18800	18600	4	2	...	...
Model FV	2097	18900	18700	4	2	...	...
Model FW	2098	19000	18800	4	2	...	...
Model FX	2099	19100	18900	4	2	...	...
Model FY	2100	19200	19000	4	2	...	...
Model FZ	2101	19300	19100	4	2	...	...
Model GA	2102	19400	19200	4	2	...	...
Model GB	2103	19500	19300	4	2	...	...
Model GC	2104	19600	19400	4	2	...	...
Model GD	2105	19700	19500	4	2	...	...
Model GE	2106	19800	19600	4	2	...	...
Model GF	2107	19900	19700	4	2	...	...
Model GH	2108	20000	19800	4	2	...	...
Model GI	2109	20100	19900	4	2	...	...
Model GJ	2110	20200	20000	4	2	...	...
Model GK	2111	20300	20100	4	2	...	...
Model GL	2112	20400	20200	4	2	...	...
Model GM	2113	20500	20300	4	2	...	...
Model GN	2114	20600	20400	4	2	...	...
Model GO	2115	20700	20500	4	2	...	...
Model GP	2116	20800	20600	4	2	...	...
Model GQ	2117	20900	20700	4	2	...	...
Model GR	2118	21000	20800	4	2
Model GS	2119	21100	20900	4	2
Model GT	2120	21200	2100				

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*The Commercial Car Journal
and Operation & Maintenance*

Trade Name and Model	General			Engine						Electrical System		Clutch	Gearset		Rear Axle		Gear Ratio		Steering Gear (Make)	Standard Wheelbase									
	Chassis Price	Standard Wheelbase (inches)	Maximum Wheelbase	Tire Size		Make and Model	Number of Cylinders	Bore and Stroke	N.A.C.C. Rated H.P.	Valve Arrangement	Oiling System		Governor (Make)	Radiator (Make)	Fuel System		Ignition System (Make)	Generator and Starter (Make)		Type and Make	Make and Model	Location	No. of Forward Speeds	Universal (Make)	Rear Axle		Gear Ratio		Front Axle Make and Model	Brakes, Location	Chassis Weight (lbs.) (stripped)
				Front (inches)	Rear (inches)							Carburetor (Make)			Fuel Feed														
Pierce-Arrow RD.....	5400	133	133	S 36x6	S 36x6	Ow RD	4-4 1/2x6 1/2	32.4	T	FP	Ow	Ow	Str	P	D-R	D-R	D. Ow	Ow RD	A	4	Spi	Ow RD	W F	7.8	41.5	B*	Ow	Ow	8650
Pierce-Arrow RF.....	5600	132	132	S 36x6	S 36x6	Ow RF	4-4 1/2x6 1/2	32.4	T	FP	Ow	Ow	Str	d	D-R	D-R	D. Ow	Ow RF	A	4	Spi	Ow RF	W F	10.0	51.9	B*	Ow	Ow	9340
Relay 40.....	3240	138	138	P 36x6	DP 36x6	Bud DS-6	6-3 1/2x6 1/2	31.2	L	PC	Ow	Ow	Zen	V	A-L	A-L	D. B-L	Ow 30	Blo	5	Blo	Ow 30	R F	6.45	34.5	G	Tim	1470AH	5300
Schacht 5 Ton.....	4480	142	142	S 36x6	S 36x6	Bud BUS.....	6-3 1/2x6 1/2	38.4	L	PC	Non	Ow	Zen	V	A-L	A-L	D. B-L	Ow 60	Blo	5	Blo	Ow 60	R F	7.88	58.5	G	Tim	1573H	7350
Schacht 7 Ton.....	3345	130	130	S 34x10	S 34x10	Wau XK	6-3 1/2x4 1/2	33.7	L	PC	Ow	Ow	Zen	G	L-N	L-N	D. Ful	Ow	Ow	4	Spi	Ow	R F	9.42	45.22	G	Ow	Ow	9200
Schacht 13 Ton.....	3365	130	130	S 36x5	S 36x5	Wau KU	6-4 1/2x4 1/2	45.9	L	PC	Ow	Ow	Zen	G	Boe-A	Boe-A	D. B-L	Ow	Ow	4	Spi	Ow	R F	10.3	65.0	B	Ow	Ow	10000
Schacht 15 Ton.....	3367	130	130	S 36x6	S 36x6	Wau SRL	6-4 1/2x4 1/2	45.9	L	PC	Ow	Ow	Zen	G	Boe-A	Boe-A	D. B-L	Ow	Ow	4	Spi	Ow	R F	14.0	88.2	B	Ow	Ow	10000
Walter FK.....	6100	Opt	118	P 40x8	DS40x8	Ow 6	6-4 1/2x4 1/2	48.4	L	PC	Ow	Ow	Zen	G	Eia	Eia	Ow	Ow	Ow	5	Ow	Ow	R D	8.50	85.0	E*	Ow	Ow	7500
Walter FHR.....	7600	Opt	136	P 40x8	DP 40x8	Ow 6	6-4 1/2x4 1/2	48.6	L	PC	Ow	Ow	Zen	V	Eia	Eia	Ow	Ow	Ow	5	Ow	Ow	R D	8.50	85.0	E*	Ow	Ow	9000
White 52T.....	4700	129 1/2	129 1/2	S 36x5 1/2	DS40x5	Ow 6	6-4 1/2x5 1/2	28.9	L	FP	Ow	Ow	Zen	V	Eia	Eia	Ow	Ow	Ow	5	Ow	Ow	R R	7.7	76.5	B*	Ow	Ow	10000
White 51A.....	3875	134	134	S 36x5 1/2	DS40x5	Ow GRB	4-4 1/2x5 1/2	25.9	L	FP	Ow	Ow	Zen	V	.....	L-N†	Ow	Ow	Ow	4	Spi	Ow	S 1/2	7.14	46.7	B*	Ow	Ow	8236
						Ow GRB	4-4 1/2x5 1/2	25.9	L	FP	Ow	Ow	Zen	V	.....	L-N†	P. Ow	Ow	Ow	4	Spi	Ow	S 1/2	7.14	46.7	B*	Ow	Ow	6045

KEY OF ABBREVIATIONS

For addresses of manufacturers listed below see Chilton Catalog and Directory

<p>Wheelbase</p> <p>*More than one wheelbase furnished.</p> <p>Tires</p> <p>B-Balloon.</p> <p>P-Pneumatics standard equip.</p> <p>DP-Dual pneumatics standard equipment.</p> <p>S-Solids.</p> <p>DS-Dual solids.</p> <p>*Tires at extra cost.</p> <p>*Pneumatics can be furnished at extra cost.</p> <p>Engine</p> <p>*Models also furnished with engine under seat.</p> <p>Bud-Buda Co.</p> <p>Con-Continental M. Corp.</p> <p>D-Head and Side.</p> <p>FP-Full Pressure to all bearings including wrist pins.</p> <p>H-Overhead.</p> <p>Has-American Motor & Fdy. Co.</p> <p>I-In Head.</p> <p>Jackson-Master M. T. Mfg. Co.</p> <p>L-L-Head.</p> <p>PC-Pressure to all crankshaft and connecting-rod bearings.</p> <p>PG-Pump, Gravity & Splash.</p> <p>PS-Pressure with splash.</p> <p>SP-Circulating splash.</p> <p>T-T-Head.</p> <p>Wau-Waukesha M. Co.</p> <p>Wis-Wisconsin M. Mfg. Co.</p> <p>Yell-Yellow Sleeve V. E. Wks.</p> <p>X-Sleeve.</p>	<p>Governor</p> <p>Dup-Elsemann Magneto Corp.</p> <p>Han-Handy Gov. Co.</p> <p>K. F. Handy Gov. Co.</p> <p>McC-E. R. Klemm.</p> <p>Mon-Monarch Gov. Co.</p> <p>Non-Not Supplied.</p> <p>Pha-Bethlehem Fabricators, Inc.</p> <p>Pie-Pierce Governor Co.</p> <p>Sim-Elsemann Magneto Corp.</p> <p>Wau-Waukesha M. Co.</p> <p>Radiator</p> <p>Bow-Bowbank E. R. Co.</p> <p>Bud-Bush Mfg. Co.</p> <p>Chi-Chicago Mfg. Co.</p> <p>Fed-Fedders Mfg. Co.</p> <p>G&O-G. & O. Mfg. Co.</p> <p>Har-Harrison Rad. Corp.</p> <p>Hex-Hexagon Rad. Corp.</p> <p>Long-Long Mfg. Co.</p> <p>McC-McCord Rad. & Mfg. Co.</p> <p>Mod-McKinnon Dash Co.</p> <p>Per-Perfex Corp.</p> <p>R-T-Rome-Turney Rad. Co.</p> <p>U. S. U. S. Cartridge Co.</p> <p>You-Young Rad. Co.</p> <p>Fuel System</p> <p>B.E.-Penberthy Injector Co.</p> <p>Car-Carter Carburetor Co.</p> <p>E-Electric Pump.</p> <p>G-Gravity.</p> <p>Joh-Johnson Carburetor Co.</p> <p>Mar-Marvel Carburetor Co.</p> <p>O-Mechanical Pump.</p> <p>P-Pressure.</p> <p>Sch-Wheeler Schebler Car. Co.</p> <p>Sie-Detroit Lubricator Co.</p> <p>Str-Stromberg Motor Dev. Co.</p> <p>Til-Tillotson Mfg. Co.</p> <p>V-Vacuum.</p> <p>Zen-Zenith-Detroit Corp.</p>	<p>Electrical Systems</p> <p>*Generator and Starter at Extra Cost.</p> <p>*Starter not supplied, Generator at Extra Cost.</p> <p>*Starter at Extra Cost.</p> <p>A-L-Electric Auto-Lite Corp.</p> <p>Apo-Apollo Magneto Corp.</p> <p>Bos-A. Am. Bosch Magneto Co.</p> <p>Bos-R-Rob. Bosch Magneto Co.</p> <p>Con-Conn. Tel. & Elec. Co.</p> <p>DJ-DeJon Elec. Corp.</p> <p>D-R-Delco-Remy Co.</p> <p>Dyn-Owen Dyneto Corp.</p> <p>Elis-Elsemann Magneto Corp.</p> <p>Ext-Electric S. B. Co.</p> <p>Gor-R. J. Gorman Co., Inc.</p> <p>L-N-Leece-Neville Co.</p> <p>N-E-North East Elect. Co.</p> <p>Non-Not Supplied.</p> <p>Poi-Prest-O-Lite Co.</p> <p>Scl-Scintilla Magneto Co.</p> <p>Spl-Splittorf Electrical Co.</p> <p>USL-USL Battery Corp.</p> <p>Ves-Vesta Battery Corp.</p> <p>Will-Willard S. B. Co.</p> <p>Clutch and Gearset</p> <p>*Other ratios optional.</p> <p>*Auxiliary two-speed transmission optional.</p> <p>A-Amidships.</p> <p>B & B-Borg & Beck Co.</p> <p>B-L-Brown-Lipe Gear Co.</p> <p>Cot-Cotter Trans. Corp.</p> <p>Cov-Covert Gear Co.</p> <p>Det-A. J. Dettaff Co.</p> <p>D-G-Detroit Gear & Mach. Co.</p> <p>D-Disk.</p> <p>Full-Fuller & Sons Mfg. Co.</p> <p>H-S-Merchant & Evans Co.</p>	<p>Unit with Jackshaft.</p> <p>I-Unit with Jackshaft.</p> <p>K-Conn.</p> <p>Lon-Long Mfg. Co.</p> <p>M. M. Mechanics Mach. Co.</p> <p>Min-Muncie Products Div.</p> <p>General Motors Corp.</p> <p>O-Oil.</p> <p>P-Piercedrive Drill. Mach. Co.</p> <p>Rock-Rockford Engine Co.</p> <p>U-Unit with Gear Co.</p> <p>W-G-Warner Gear Co.</p> <p>Yell-Yellow Sleeve V. E. Wks.</p> <p>Universal</p> <p>B.G.-Universal Machine Co.</p> <p>Blo-Blood Bros. Mach. Co.</p> <p>Cle-Cleveland St. Prod. Corp.</p> <p>Har-Spicer Mfg. Co.</p> <p>M.E.-Mechanics & Evans Co.</p> <p>M-M-Mechanics Machine Co.</p> <p>Pet-Pick Mfg. Co.</p> <p>Pie-Pick Mfg. Co.</p> <p>Spi-Spicer Mfg. Co.</p> <p>Spi-B-Spicer and Blood Bros.</p> <p>The-Thermoid Rubber Co.</p> <p>U-M-Universal Machine Co.</p> <p>U-P-Universal Products Co.</p> <p>Front and Rear Axles</p> <p>*Two speed</p> <p>1/2-Semi-Floating.</p> <p>3/4-Three-Quarter Floating.</p> <p>B-Straight Bevel.</p> <p>Cla-Clark Equip. Co.</p> <p>Col-Columbia Axle Co.</p> <p>Con-Continental Axle Co.</p> <p>C-Chain.</p> <p>D-Dead.</p> <p>Eat-Eaton Axle Co.</p> <p>F-Floating.</p> <p>I-Internal Gear.</p> <p>R-Double Reduction.</p> <p>S-Spiral Bevel.</p>	<p>Sal-Salisbury Axle Co.</p> <p>She-Sheldon Axle & Spring Co.</p> <p>Shu-Shuler Axle Co., Inc.</p> <p>Tim-Timken Det. Axle Co.</p> <p>Tor-Eaton Axle & Spring Co.</p> <p>W-Worm.</p> <p>Wis-Wisconsin Axle Co.</p> <p>Brake</p> <p>A-Rear Wheels only.</p> <p>B-Driveshaft and Rear Wheels.</p> <p>D-Jackshaft and Rear Wheels.</p> <p>E-4-Wheel Brakes.</p> <p>F-4-Wheel Brakes with emergency on jackshaft.</p> <p>G-4-Wheel Brakes with emergency on driveshaft.</p> <p>H-4-Wheel Brakes with emergency on rear wheels.</p> <p>I-4-Wheel Brakes with emergency on propeller shaft.</p> <p>J-Driveshaft.</p> <p>K-Service & Emergency Brakes on four wheels.</p> <p>Service Brake Type</p> <p>*Mechanical.</p> <p>*Hydraulic.</p> <p>*Vacuum Booster.</p> <p>*Compressed Air.</p> <p>Steering Gear</p> <p>CAS-Columbus G. & P. Co. Co.</p> <p>D-G-Detroit Gear & Mach. Co.</p> <p>Dod-Dodge Bros. Co.</p> <p>Gem-Gemmer Mfg. Co.</p> <p>Han-Hannum Mfg. Co.</p> <p>Jac-Saginaw Steering Gear Div. General Motors Corp.</p> <p>Lav-Hannum Mfg. Co.</p> <p>Ros-Ross Gear & Tool Co.</p>
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